EVALUATION OF ANALGESIC EFFICACY OF PREOPERATIVE BILATERAL SUPERFICIAL CERVICAL PLEXUS BLOCK IN PATIENTS UNDERGOING THYROIDECTOMY UNDER GENERAL ANAESTHESIA

A STUDY OF 60 CASES

DISSERTATION SUBMITTED FOR THE DEGREE OF

DOCTOR OF MEDICINE

BRANCH – X (ANAESTHESIOLOGY)

APRIL-2013

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CHENNAI

TAMILNADU

BONAFIDE CERTIFICATE

This is to certify that this dissertation entitled **"EVALUATION OF ANALGESIC EFFICACY OF PREOPERATIVE BILATERAL SUPERFICIAL CERVICAL PLEXUS BLOCK IN PATIENTS UNDERGOING THYROIDECTOMY UNDER GENERAL ANAESTHESIA"** is a bonafide record work done by **Dr. HARISH KUMAR M.P.** under my direct supervision and guidance, submitted to the Tamil Nadu Dr. M.G.R. Medical University in partial fulfillment of University regulations for MD, Branch X–Anaesthesiology.

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DECLARATION

I, Dr. HARISH KUMAR M.P. solemnly declare that, this dissertation titled **"EVALUATION OF ANALGESIC EFFICACY OF PREOPERATIVE BILATERAL SUPERFICIAL CERVICAL PLEXUS BLOCK IN PATIENTS UNDERGOING THYROIDECTOMY UNDER GENERAL ANAESTHESIA"** has been done by me. I also declare that this bonafide work or a part of this work was not submitted by me or any other for any award, degree or diploma to any other University or board either in India or abroad.

This is submitted to The Tamilnadu Dr. M. G. R. Medical University, Chennai in partial fulfillment of the rules and regulation for the award of Doctor of Medicine degree Branch –X (Anaesthesiology) to be held in April 2013.

Place: Madurai **Dr. HARISH KUMAR M.P.**

Date:

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CONTENTS

ABBREVIATIONS

BSCPB	–	Bilateral Superficial Cervical Plexus Block
PACU	–	Post Anaesthetic Care Unit
SICU	–	Surgical Intensive Care Unit
VAS	–	Visual Analogue Scale
ASA	–	American Society of Anaesthesiologists
RSS	–	Ramsay Sedation Score
MNG	–	Multi Nodular Goitre
SNG	–	Solitary Nodular Goitre
CA	–	Carcinoma
SBP	–	Systolic Blood Pressure
DBP	–	Diastolic Blood Pressure
HR/PR	–	Heart Rate / Pulse Rate
ETCO2	–	End Tidal Carbondioxide
SPO2	–	Oxygen Saturation
NTT	–	Near Total Thyroidectomy
STT	–	Sub Total Thyroidectomy
TT	–	Total Thyroidectomy

INTRODUCTION

“For all the happiness that mankind can gain

It is not in pleasure but in relief from pain”

- JOHN DYRDEN

Pain is a fundamental biological phenomenon.

Pain is an ‘‘unpleasant sensory and emotional experience that occurs in response to tissue damage’’. It is always underestimated and under treated. The relief of pain during surgery is the main part of anaesthesia.

Pain is perhaps the most feared symptom of disease and man has tried his level best to discover methods to relieve pain.

Pain relief is provided by various methods like oral medication, nerve blocks but adequate pain relief is provided by interrupting the transmission of pain.

Peripheral nerve blocks provide longer and more localized pain relief than systemic opioids, non-steroidal anti-inflammatory drugs. Regional anaesthetic technique provides anaesthesia as well as analgesia than general anaesthesia as it requires an alternative technique to provide analgesia in the post-operative period.

The mode of pain relief should be such that it is technically less harmful, has minimal side effects, makes the surgeon comfortableand has extended post-operative comfort and also cost effective. In modern medicine, postoperative analgesia is considered an integral part of the anaesthetic management.

Recently regional anaesthetic techniques including peripheral nerve blocks are commonly used in the management of perioperative pain because of their distinct advantages over general anaesthesia and central neuraxial anaesthesia.

Pain relief with peripheral nerve block is devoid of adverse effects like somnolence, haemodynamic instability, nausea, vomiting and voiding difficulties inherent to general anaesthesia and central neuraxial anaesthesia.

All patients require adequate pain relief during the first 24 hours postoperatively. Post-operative pain can be treated with drugs like opioids or non-steroidal anti-inflammatory agents.

Usually surgeons are reluctant to use NSAIDs so soon after any type of procedure because of fear of bleeding complications. Opioids have many well-known undesirable effects, like nausea and vomiting which can occur postoperatively due to surgery or anaesthesia itself.

Pain following thyroidectomy is of shorter duration with moderate intensity. But even then most of the patients require analgesics like opioids or non-opioid agents.

But thyroid surgery itself is associated with high incidence of post-operative nausea and vomiting, so it is better to avoid analgesics that cause nausea and vomiting like opioids, nefopam etc.

Other methods to reduce postoperative pain following thyroid surgeries include wound infiltration with local anaesthetics, cervical plexus block which includes both superficial and deep cervical plexus block.

Among this bilateral superficial cervical plexus block is commonly used due to its efficacy and simplicity in performing the technique and without much complications. Deep cervical plexus block is an alternative technique but associated with serious complications like phrenic nerve palsy.

The present study was done to evaluate the analgesic efficacy of preoperative bilateral superficial cervical plexus block for thyroid surgeries. 10 ml of 0.25% bupivacaine is given bilaterally in study group and 10 ml of normal saline in control group.

AIM OF THE STUDY

To evaluate the analgesic efficacy of preoperative bilateral superficial cervical plexus block in patients undergoing thyroidectomy under general anaesthesia.

The analgesic efficacy of the block is assessed in terms of:

- Total dose of Intraoperative requirements of Fentanyl
- Total dose of Postoperative requirements of Morphine
- Postoperative side effects
- Complications associated with the procedures

HISTORY

The doctrine of specific energies of the senses, proclaimed by **Johannes P. Mueller (1801–58) in 1826** – that it is the nerves that determine what the mind perceives – opened up a new field of scientific thought and research into nerve function. This led directly to the theory that pain is a separate and distinct sense, formulated by Moritz S. Schiff (1823–96) in 1858.

Sir Francis Rynd delivered morphine solution into the nerve in order to relieve pain due to intractable neuralgia and this was the first documented nerve block.

Sir Francis Rynd (1801 – 61), delivered the solution by means of gravity through a cannula. The first use of a syringe and hypodermic needle was in 1855, by Alexander Wood (1817–84), Edinburgh.

Halsted and Hall described the injection of cocaine into peripheral sites for minor surgeries in 1880s.

Cervical plexus blocks were first performed by **Halsted at Bellevue Hospital in New York in 1884.** Halsted performed many experiments with the new anesthetic cocaine, including an experiment showing that excellent surgical anesthesia could be obtained by injecting the nerve trunks in the neck.

The **first description of cervical plexus block for surgical anesthesia was published in Germany in 1912 by Kappis, who advocated a posterior approach**. **In 1914, Heidenhein introduced the lateral approach to cervical plexus block**. These techniques were **popularized in France by Pauchet** and in **America by Labat**.

Methods of cervical plexus block:

- Deep
- Intermediate
- Superficial

Deep cervical plexus block – (Moore or Winnie)

C2- C4 transverse processes identified and the drug injected into deep (prevertebral) cervical region. Can be done by either three separate injections or as single one.

Intermediate cervical plexus block –

Here drug is injected deep to subcutaneous layer but above deep cervical fascia.

Superficial cervical plexus block – (Murphy and Scott) : It is the simplest technique which involves subcutaneous injection of drug at the midpoint of sternocleidomastoid muscle along the posterior border .

SUPERFICIAL CERVICAL PLEXUS BLOCK

Cervical plexus:

The cervical plexus is formed by the union of anterior rami of upper 4 cervical nerves.

The cervical plexus is formed as loops which are 3 in number

- C1-2
- C2-3
- C3-4 with another loop (C4-5) to connect with brachial plexus.

They are located on the levator scapulae and scalenus medius muscles under the cover of sternocleidomastoid.

C1 does not have any cutaneous innervations.

Cervical plexus branches:

- Communicating branches- to the cervical sympathetic chain, Hypoglossal nerve, Vagus.
- Superficial branches which supply cutaneous fibres to neck.
- Deep branches which supply the neck muscles.
- Phrenic nerve provides the motor supply to diaphragm.

The Superficial Cervical Plexus is divided into 4 terminal branches :

- Ascending - greater auricular nerve(C2,3)
  lesser occipital nerve (C2)
- Transverse - (C2,3) anterior cutaneous nerve to neck
- Descending -(C3,4) supraclavicular nerves – medial intermediate and lateral branches.

Lesser occipital nerve:

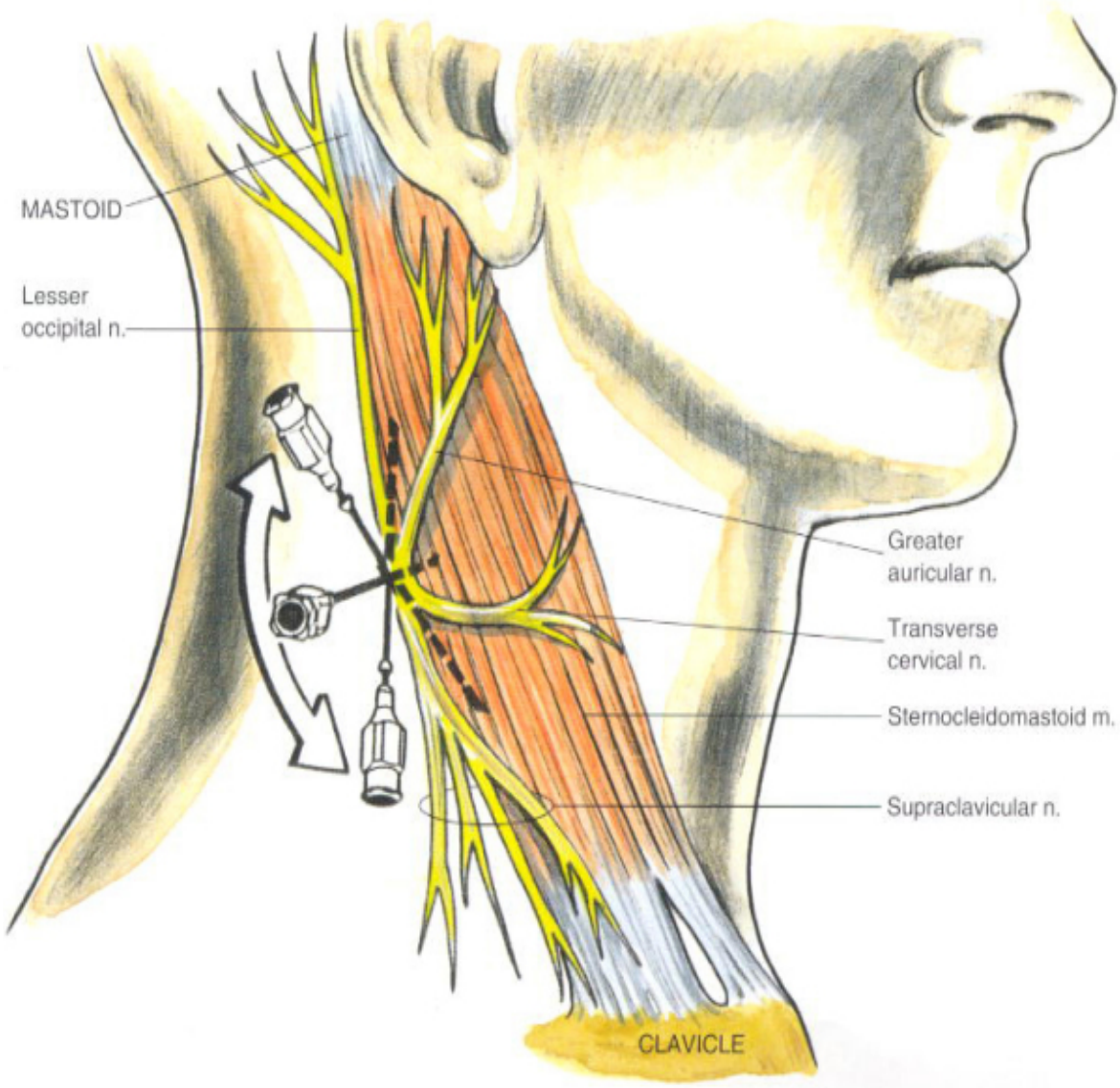
This ascending branch of superficial cervical plexus hooks around spinal accessory nerve and then it ascends along the posterior border of sternocleidomastoid. It pierces the deep fascia in the posterior triangle of neck, where it splits up into 3 branches.

- Auricular
- Mastoid
- Occipital

Great auricular (C2, C3) nerve:-

It is the largest cutaneous branch. It hooks around the midpoint of the posterior border of sternocleidomastoid muscle, and then it passes across the muscle in the direction of angle of the mandible.

On the same muscle it divides into 3 branches.



SUPERFICIAL CERVICAL PLEXUS BLOCK: ANATOMY AND TECHNIQUE

- Auricular - sensory supply to lower 2/3rds of the medial aspect of external ear and the lateral surface of the lobule.
- Mastoid - It supplies the skin overlying the mastoid.
- Facial - It supplies the skin overlying masseter muscle and parotid gland.

Anterior cutaneous nerve of the neck(C2,3)-

It arises at the posterior border of sternocleidomastoid below the great auricular nerve and then its course turns horizontally forwards on the muscle, deep to external jugular vein.

Supraclavicular nerves (C3,4)-

It has three branches:

- Medial
- Intermediate
- Lateral

These supply the skin over the upper sternum, the upper chest wall, and the upper deltoid.

SUPERFICIAL CERVICAL PLEXUS BLOCK :-

Landmark Technique

Distribution of anaesthesia-

The superficial cervical plexus block results in anesthesia of the skin of the anterolateral aspect of neck and the anterior auricular, posterior auricular areas, and also skin overlying and immediately inferior to the clavicle on the chest wall. But it produces only sensory blockade while Deep Cervical Plexus block produces both sensory and motor blockade.

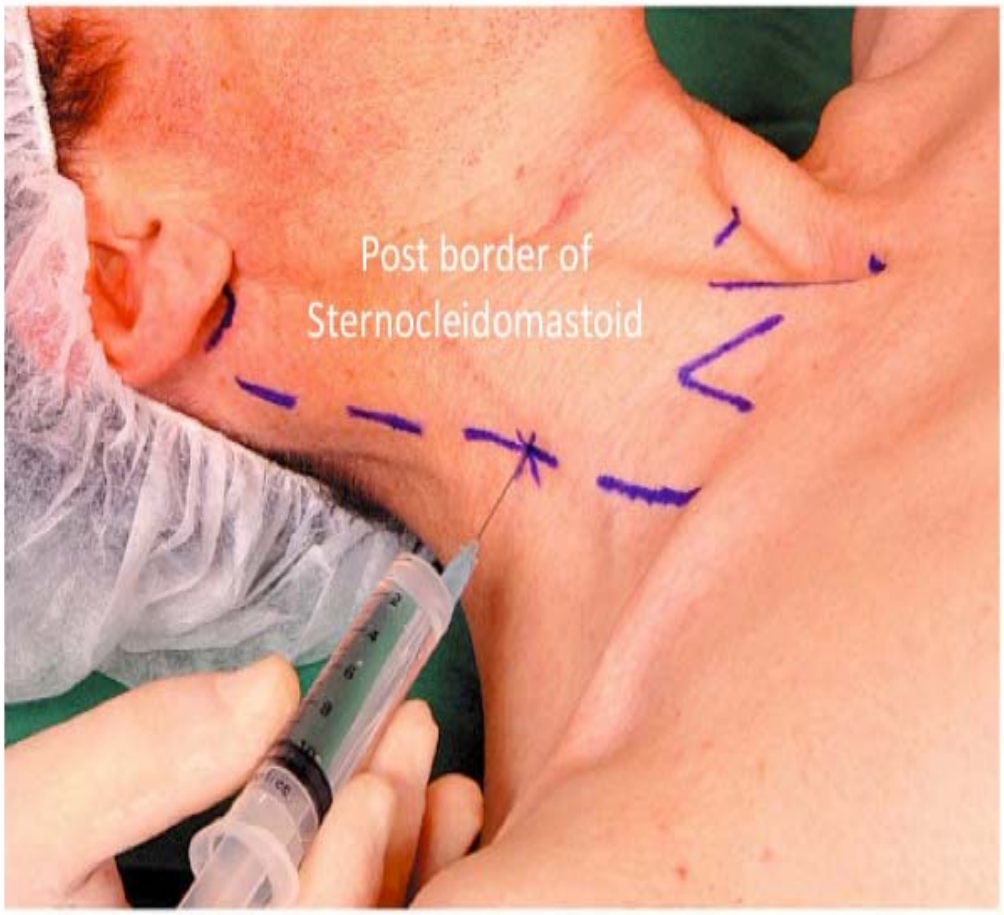
Patient positioning-

Place the patient in Supine position, with the head turned slightly away from block site. Ipsilateral arm is placed on patient's side. The patient's neck and upper chest should be exposed maximally so that the absolute length and position of the sternocleidomastoid can be assessed.

Equipments-

A tray with following equipments :

- Sterile towels
- 4"× 4" gauze pieces
- 20-ml syringe
- Marker pen,
- Sterile gloves
- 11/2" 25-gauge needle for block infiltration.



SUPERFICIAL CERVICAL PLEXUS BLOCK, LANDMARK TECHNIQUE

LANDMARKS:

- Chassaignac's tubercle of C6.
- Mastoid process.

ANATOMIC LANDMARKS:

A line is drawn extending from the mastoid to C6 cervical vertebra. At the midpoint of the line which connects the mastoid process with Chassaignac's tubercle of C6 transverse process the needle is inserted. This is the point where the branches of the superficial cervical plexus emerge behind the posterior border of the sternocleidomastoid muscle or simply the midpoint of posterior border of sternocleidomastoid muscle.

TECHNIQUE:

After painting and draping the parts, midpoint of posterior border of sternocleidomastoid muscle is identified. Local infiltration is given at the entry point. Then ten ml of solution is given subcutaneously in a fan shaped manner along the posterior border of sternocleidomastoid, 6 ml in up and down direction and 4ml just above the muscle horizontally to block all the 4 terminal branches .

The main goal of this technique is to infiltrate the local anaesthetic subcutaneously and behind sternocleidomastoid. Deep needle insertion should be avoided.(should be less than 1-2cm).

ULTRASOUND GUIDED TECHNIQUE:

This technique is considered to be the most precise way of blocking the respective nerves.The primary goal of such technique is to deposit local anaesthetic in the vicinity of the sensory branches of the nerve roots C2, C3 and C4.

Advantages:

- Ability to ensure the spread of local anaesthetic in the correct plane.
- Increase the success rate.
- Avoid too deep needle insertion.
- Inadvertent puncture of neighbouring structures.

Both in-plane and out-of-plane approaches can be used.

The sternocleidomastoid muscle forms a “roof” over the nerves of the superficial cervical plexus(C2-4).The roots combine to form the four terminal branches and emerge from behind the posterior border of the sternocleidomastoid. The plexus can be visualized as a small

collection of hypoechoic nodules (honeycomb appearance or hypoechoic oval structures) immediately deep or lateral to the posterior border of the sternocleidomastoid.

LOCAL ANAESTHETIC OF CHOICE:

The block requires 3-5ml for each redirection. So 10-15ml of local anaesthetic is needed in total.

LOCAL ANAESTHETIC	ONSET TIME(min)	ANAESTHESIA(hrs)	ANALGESIA(hrs)
Mepivacaine 1.5%	10-15	2.0-2.5	3.0-6.0
Lidocaine 2%	10-15	2.0-3.0	3.0-6.0
Ropivacaine 0.5%	10-20	3.0-4.0	4.0-10.0
Bupivacaine 0.25%	10-20	3.0-4.0	4.0-10.0

After 10–15 minutes of blockade, there will be decreased sensation around the area of nerve distribution.

Indications for cervical plexus blocks:-

- Superficial neck surgeries.
- Carotid endarterectomy.
- Thyroidectomy and Para-thyroidectomy.
- Lymph node dissection and plastic repair of neck.
- Shoulder surgery (supplemental brachial plexus block).
- Tracheostomy.
- Central venous cannulation via internal jugular or subclavian routes.
- Cervicogenic headaches.
- Injuries to the ear, neck and clavicular region including clavicular fractures and acromio-clavicular dislocations.
- Complex regional pain syndrome.
- Post-herpetic neuralgia.
- Postoperative pain.

Carotid endarterectomy still remains the commonest indication for cervical plexus blocks, usually unilateral combined superficial and deep cervical plexus block.

Contraindications:-

- Hemorrhagic diathesis
- Local neural injury
- Respiratory compromise
- Anti-coagulation treatment
- Anatomic distortion (due to previous surgery or trauma)

Complications:-

1. **Hematoma-**

Accidental carotid or vertebral artery puncture mainly in anticoagulated patients leads to hematoma. Keep at least five minutes steady pressure on the site when the artery is punctured inadvertently

2. **Infection-**

Strict aseptic technique is to be employed for its prevention.

3. **Blockade of phrenic nerve-**

Phrenic nerve blockade leads to diaphragmatic paralysis. It occurs mainly with deep cervical plexus block, so bilateral deep cervical plexus block is contraindicated. But it is very rare with superficial cervical plexus block.

4. **Spinal or Epidural anaesthesia** –

Negative aspiration test is must before injecting the drug. Drug should not be injected under pressure and it is better to avoid large volume of drug. It can occur with deep cervical plexus block but rare with superficial cervical plexus block.

5. **Nerve injury** –

It is due to direct needle injury. So when resistance to injection or severe pain is felt stop injecting the drug.

6. **Local anesthetic drug toxicity** –

Most commonly used drugs include Bupivacaine or Ropivacaine. It is mainly due to inadvertent intravascular injection and very rarely due to absorption. Is more common in this procedure because of high vascularity due to vertebral and carotid vessels.So careful aspiration is must while injecting the drug. CNS toxicity is more common.

Accidental intravascular injection into vertebral artery is common with deep cervical block, so constant verbal contact with the patient is must while injecting the drug.

7. Occurs rarely –

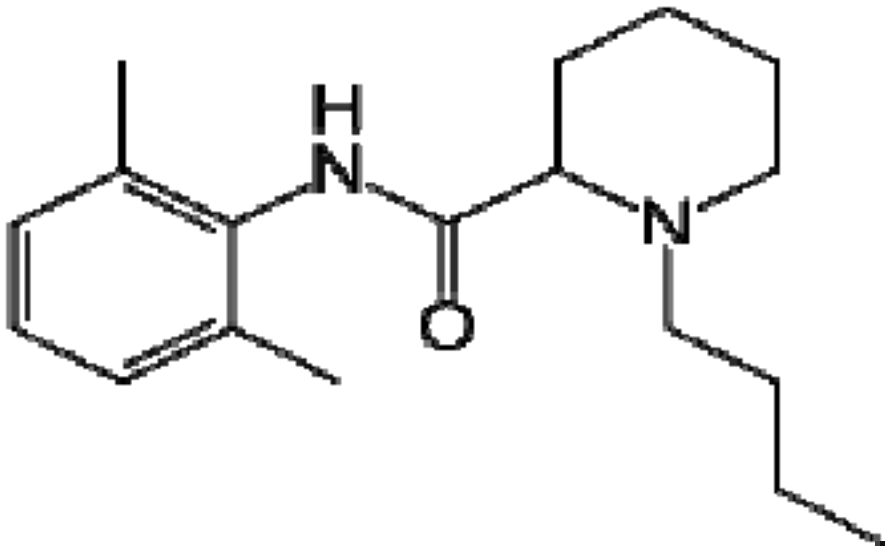
- Horner's syndrome due to sympathetic chain blockade,
- Hoarseness, dysphagia due to recurrent laryngeal nerve blockade,
- Upper limb anesthesia due to partial blockade of brachial plexus blockade.

Serious complications like phrenic nerve palsy, vertebral artery injection, subarachnoid injection are more common with deep cervical plexus block so performing this block bilaterally is contraindicated but superficial cervical plexus block which is associated with minimal complications can be performed bilaterally without any major concern.

APPLIED PHARMACOLOGY

PHARMACOLOGY OF BUPIVACAINE HYDROCHLORIDE

Bupivacaine was synthesized in Sweden by Ekenstam and his colleagues in 1957. It was introduced into clinical practice by L J Telivuo in 1963.



Chemically it is 1 – butyl - N – 2,6 – dimethyl phenyl , piperdine -2-carboxamide.

The structure is similar to Mepivacaine, with a butyl group replacing a methyl group in the Piperidine ring. This increases lipid solubility and protein binding. High potency is associated with high lipid solubility.

PHYSIO CHEMICAL PROPERTIES:

Molecular Weight	: 288 (base)
pka at 25ºC	: 8.1
Percentage of protein binding	: 95.6%
Plasma protein binding	: 2 µgm/ml
Partition coefficient	: 27.5 (n-Haptane pH-7.4 buffer)
Approx. anaesthetic duration	: 175mts.
Site of metabolism	: liver
Safe dosage	: 150mg or 2 mg/kg
Toxic	: 4-6 times more toxic than Lignocaine.

Bupivacaine is manufactured in concentration of 0.25% and 0.5%. Autonomic blockade is produced by 0.125% solution and this has been reported to relieve the pain of labour. Sensory blockade is produced with very minimal motor blockade by 0.25% solution. Motor blockade is provided by 0.5% solution.

Bupivacaine has a much more pronounced effect upon sensory nerves than motor nerves, and intense anaesthesia may often be obtained without any motor blockade. This is a special advantage in the treatment of pain such as post-operative, post traumatic and labour pain.

Duration of analgesia is between 5 and 16 hours and is the longest of any local anaesthetics known. It may be related to its increased protein binding. Commercially it is available as

hydrochloride salt. Carbonated Bupivacaine is also available and is said to act intensely and widespread. Development of tachyphylaxis is much less common than with Lignocaine.

Action on the cardio vascular system:-

Bupivacaine is relatively more cardiotoxic than Lignocaine. It is powerful myocardial depressant and this is made worse by hypoxia, hypercarbia and by pregnancy.

Ventricular arrhythmias including ventricular fibrillation are more lethal nature of Bupivacaine toxicity, probably due to its high lipid solubility which causes it to bind firmly to the myocardium there by reducing cardiac efficiency.

According to **Moore et al**(1979), an arterial plasma concentration of 5.4 µgm/ml following an intravenous bolus of Bupivacaine resulted in convulsions. The arterial plasma level of Bupivacaine must be more than 4µgm/ml before convulsions appear.

Safety dosage: (2.0mg/kg or 150mg)

The blood concentration associated with maximum effective dose (c_{max}) is 0.7µgm/ml (i.e., with 150mg of 0.5-0.75% Bupivacaine).

The blood concentration associated with early signs of toxicity (c_{tox}) with the same dose of drug is 1.6µgm/ml. The toxicity ratio of Bupivacaine is (c_{tox} / c_{max}) 2.3 **(Tucker et al).** However recent studies

indicate that higher doses of Bupivacaine 3mg/kg may be used provided direct vascular injection is carefully avoided.

METABOLISM

Breakdown of bupivacaine is similar to that of mepivacaine and commences with removal of the piperidine side chain. The product **Pipecolyxylidine (PPX)** is approximately one-eighth as toxic as bupivacaine. PPX and unchanged bupivacaine are slowly excreted in about equal proportions in the urine.

Reynolds (1971), Boyes (1975) reviewed the metabolism of Bupivacaine. Hydroxylation of the aromatic ring is believed totake place in case of Bupivacaine as with Lignocaine to produce a compound that can be conjugated and made water soluble.

Rothenstein (1983) demonstrated that the human lungs extracted local anaesthetic from circulation and subsequently released it back into circulation. It is seen with Bupivacaine also. For Bupivacaine the first pass pulmonary extraction is dose dependent suggesting that uptake process become saturated rapidly **(Rothenstein 1984).**

Propranolol impairs Bupivacaine extraction by lungs, perhaps reflecting a common receptor site for the two drugs. The conjugated water soluble metabolite **N-desbutyl bupivacaine** is extracted in urine and it is less than 40 % of the total local anaesthetic dose.

MECHANISM OF ACTION OF LOCAL ANAESTHETICS :

The sequence whereby clinically used local anaesthetics produce inhibition of axonal conduction has been summarized by **Corvino** as follows.

Clinically all the local anaesthetics exist in solution in both charged and uncharged forms, the relative proportions depending on the pH of the solution, the pH at the site of injection and pKa of each drug. The cation is responsible for most of the nerve blocking effect.

The clinically used local anaesthetics act primarily on specific receptors which are present in the inner aspect of sodium channel.

Other possible sites of action include,

A) Non-specific absorption within the cell membrane lipids resulting in membrane expansion and channel narrowing.

B) Diffusion of the unchanged base via hydrophobic pathways through the membrane lipids to reach the specific receptor site, where protonation and binding occur in the internal aspect of sodium channel.

The surface charge theory: The mechanism assumes penetration of the axonal membrane by the lipophilic portion of the anaesthetic molecules and neutralization of axolemmal surface negative charges by the positively charged terminal amino group of the molecule.

An accumulation of sufficient positive charges would tend to neutralize the relatively electronegativity of the external membrane surface resulting in an increase in the trans membrane potential without altering the intracellular resting potential.

A sufficient increase in the trans membrane potential would inhibit the ability of an electric current from a nearby unanaesthetised portion of the nerve membrane to depolarize the treated area to its threshold for firing. Conduction blockade would then result.

The surface charge theory requires that the charged form of local anaesthetic be the active form.

Therapeutic Uses:

- Spinal anaesthesia
- Epidural anaesthesia
- Peripheral nerve blocks
- Infiltration analgesia

Toxicity

1.Cardiovascular System: More cardio toxic than equieffective dose of lidocaine. Manifested clinically as ventricular and myocardial depression after inadvertent intravascular administration of Bupivacaine.

Mechanism of toxicity

Although both lignocaine and Bupivacaine block cardiac sodium channels during systole, Bupivacaine dissociates more slowly than lignocaine and therefore significant fraction of sodium channels remain blocked during diastole. Thus the block is cumulative and substantially more than that is predicted by its local anaesthetic potency. A percentage of its cardiac toxicity is centrally mediated. Toxicity is enhanced by acidosis, hypoxemia, and hypercarbia. (**Levobupivacaine** the s - enantiomer of bupivacaine is also available with less cardio toxicity)

2. Allergic reactions: Due to the methyl paraben or similar preservatives that are structurally similar to para aminobenzoic acid and allergic reactions are due to antibody stimulation by the preservative.

3. Central nervous system: initially there is blockade of amygdaloid complex followed by blockade of inhibitory pathways in cerebral cortex. Further increase in dose suppresses facilitatory pathways leading to central nervous system depression and respiratory arrest.Symptoms include light headedness, dizziness, circumoral and tongue numbness,visual and auditory disturbances,shivering,twitching over distal extremities and face, tonic clonic convulsions,coma and respiratory arrest. Seizures are produced by selective inhibition of the

inhibitory neurons of Central nervous system leaving unopposed excitatory neuron activity.

Contraindications:

1) Hypersensitivity

2) Should not be used with vasoconstrictor in digits of hand, feet and Penis

3) Stokes Adams syndrome, severe degree of heart block.

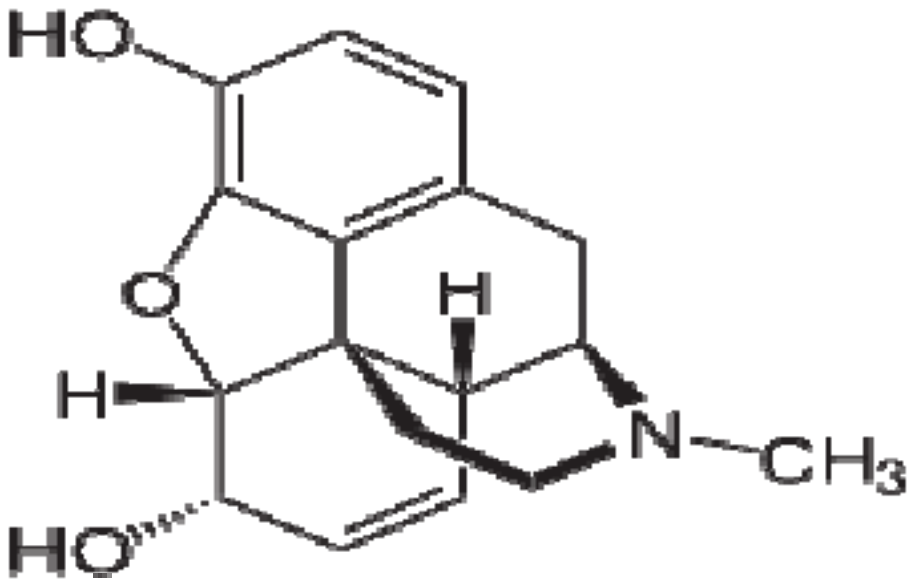
Management of Toxicity:

Cardiac arrest due to local anaesthetic toxicity is very difficult to revive. Massive doses of adrenaline and atropine are required. Phenytoin and Bretylium can also be used.

For central nervous system toxicity management is mainly supportive. Endotracheal intubation and mechanical ventilation to prevent aspiration, hypoxemia and hypercarbia. Thiopentone sodium and Benzodiazepines are used to control convulsions.

PHARMACOLOGY OF MORPHINE SULPHATE

Morphine is a naturally occurring opioid derived from poppy plant. It is a morphinan or Thebaine derivative and it's a pure agonist.



Chemically it is 5α,6α-7,8 – didehydro-4,5-epoxy-17 – methyl morphinan -3,6- diol.

Morphine is a:

- Prototype opioid
- From which other opioid drugs compared.

MECHANISM OF ACTION:

Act through opioid μ receptors present in central nervous system. Ionized state of opioid is required for strong binding with anionic opioid receptor site. Levo rotatory forms are most active. Analgesic potency depends on affinity of drug to opioid receptor.

1. Binding of drugs leads to decrease activity of adenyl cyclase activity which leads to hyperpolarization of the neurons and suppression of pain response impulse.

2. Inhibit release of neurotransmitters like Acetylcholine, Dopamine, Nor-epinephrine, substance P which leads to suppression of impulse conduction.

3. Depression of cholinergic transmission.

Does not alter responsiveness of afferent nerve ending to noxious stimulation. Does not impair nerve conduction in peripheral nerve.

Medical uses:

- Anaesthesia and Analgesia.
- Acute and chronic severe pain.
- Myocardial infarction.
- Acute pulmonary edema.

Duration of analgesia:

3–4 hours - Intravenous,

- Subcutaneous,

- Intramuscular route.

3–6 hours - Oral route.

Routes of administration: Intravenous, intramuscular, subcutaneous, oral, rectal, inhalation, insufflations, intrathecal, epidural.

Pharmacokinetics:

- Low lipid solubility.
- Biotransformation in liver into active metabolite – morphine 6 glucuronide.
- Slow onset and prolonged duration of action.
- Only 10 -20 % drug remains unionized due to high pKa 8.
- 20 – 40 % protein binding mainly to albumin.
- 90 % hepatic metabolism.
- Half-life of 2 – 3 hours.
- Excretion mainly through renal route and 10% of biliary route.
- Undergoes extensive first pass metabolism so oral bio-availability is only 20-40% but 100% via parental route.

Metabolites: 80% morphine 3 glucoronide, 10% Morphine 6 glucoronide and 5% Nor morphine.

Morphine 6 glucoronide is active one → can cause Analgesia and late respiratory depression.It is more potent μ receptor agonist than morphine.

Morphine 3 glucuronide doesn't bind with opioid receptor.

Elimination delayed in:

1) Renal Failure

2) MAO Inhibitors

3) Elderly

4) Neonates

PHARMACO DYNAMICS:

Cardiovascular System:

- Not a direct myocardial depressant
- Bradycardia → increases vagal tone , depresses Sino atrial node
- Hypotension due to histamine release and decrease in sympathetic discharge . It is severe when,
  - Given along with Inhalational anaesthetics & benzodiazepines
  - In dehydrated patient
  - Position other than supine

Respiratory System:

- Dose dependent respiratory depression
- Depress respiratory centre

- Reduce the carbon dioxide responsiveness
- Reduce rate of respiration
- Bronchoconstriction → Direct histamine release

Central Nervous System:

- Analgesia
- Sedation
- Euphoria
- Doesn't produce unconsciousness
- Skeletal muscle rigidity
- Miosis.

Biliary System: Biliary colic

Gastrointestinal Tract:

1) Contraction of all sphincters. Reduces Intestinal motility and leads to constipation.

2) Nausea & Vomiting: due to

- Direct stimulation of chemo receptor trigger zone (CTZ)
- Diminished peristalsis
- More with intramuscular route than intravenous route

Placenta:

- Easily crosses placental barrier.
- Produce more neonatal depression than pethidine.

Dose:

- 0.1mg/kg for premedication
- 0.2mg/kg for IV administration
- 1-3 mg → Epidural
- 100 – 300 µg → Spinal

- Tolerance → 2-3 weeks of usage
- Dependence → 3-4 weeks of usage

Withdrawal syndrome → occur in 15-20 hrs,takes 10-14 days to clear.

Over Dosage: TRIAD →Coma, Miosis,Hypoventilation

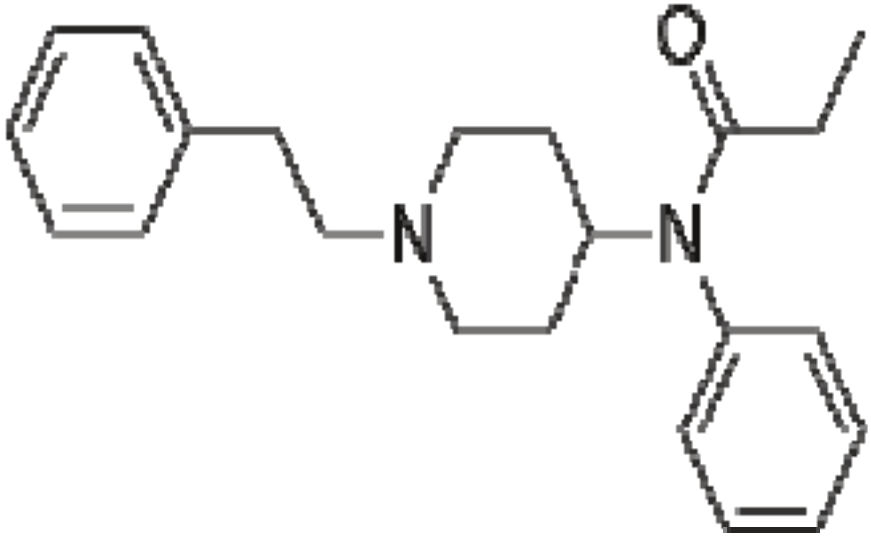
Naloxone is used for reversal of respiratory depression caused by opioid overdose as well as treatment of opioid poisoning.

Renarcotization – reappearance of respiratory depression can occur even after Naloxone reversal due to its short half-life (30 – 60minutes)

PHARMACOLOGY OF FENTANYL CITRATE

Paul Janssen first synthesized fentanyl in the year 1960.

- Synthetic opioid agonist.
- Phenyl piperidine derivatives.



Chemically it is N -1-2- phenylethyl-4- piperidinyl-N-phenyl propanamide

Fentanyl as an analgesic is more potent than morphine (75 – 125 times more potent).

Fentanyl analogues include sufentanil, alfentanil, remifentanil, and lofentanil.

Uses:

- Anesthesia and Analgesia in operation theatre and intensive care unit.
- Sedation for endoscopy and cardiac catheterization.
- Treatment of chronic pain like cancer pain.
- Intrathecal and epidural analgesia.

Pharmacokinetics:

- Intravenous dose → onset 30 seconds
- Shorter duration of action
- Long elimination half time
- All are because of greater lipid solubility and redistribution in to fat tissue
- 80 % plasma protein binding mainly with α1 acid glycoprotein
- <10 % unionized fraction when pKa is 8.4
- Extensive pulmonary uptake
- Extensively metabolized in liver
- Small dose – termination of action depends on redistribution
- Large dose – termination of action depends on clearance via liver
- Metabolites are inactive
- Excreted in bile & urine

- Elimination half time 185 – 219 min greater than morphine
- Further increased in elderly patients, abdominal aortic surgery patients.

Dose: Wide range of doses

- 1-2 µg/kg → Analgesia
- 2-10µg/kg → Attenuate stress response
- 50-150 µg/ kg → Sole anesthetic
- oral trans-mucosal route - Lollipop 2-20µg/kg,
- Transdermal patch - 75-100µg/h Postoperative analgesia for 24 hrs.
- Intrathecal (10 - 30µg)
- Epidural (50 - 100 µg)

Problems:

- **Persistent (or) Recurrent ventilatory depression -**due to mobilization of opioid from its peripheral storage sites into central compartment
- **Bradycardia more than morphine.**
- **Skeletal muscle rigidity and myoclonus in large doses.**

REVIEW OF LITERATURE

1. Alexandria Journal of Anaesthesia and Intensive Care Vol. (8) No. 4 December 2005, Hisham Negmi MD et al

They studied the effect of bilateral superficial plexus block done priorto surgery in reducing the post thyroidectomy pain.Totally fifty patients between the age group of 20 – 40years, they were divided into two groups. Bilateral superficial plexus block was done in Group C (Control group) with 20 mL of isotonic Normal Saline solution and Group B (Bupivacaine group) with 20 mL bupivacaine 0.25% performed before induction of general anesthesia. After surgery, patients were transferred to the PACU where they stayed for 2 hours, then were transferred to the post-operative ward. Patients were followed up for 24 hours post operatively. Postoperative pain, Patients' satisfaction, total amount of morphine consumption in the recovery room and within 24 hours post operatively was also recorded. The Bupivacaine group had decreased requirement of morphine in the recovery room and 24 hours after surgery. Patients who were given bilateral superficial plexus block had lower VAS scores compared to the Group C (Control group).

They concluded that bilateral superficial cervical plexus block with Bupivacaine decreases the intensity of post-operative pain after thyroid surgery and also decreases the post-operative opioid requirements.

2. British Journal of Anaesthesia- 99 (4): 561–6 (2007) G. Andrieu et al.

They conducted the study to assess the analgesic efficacy of bilateral superficial cervical plexus block performed just after induction of general anaesthesia in subjects undergoing thyroidectomy procedures. They were allocated into 3 groups. Group P (Normal saline), Group R (Ropivacaine 0.5%) and Group RC (Ropivacaine 0.5% and clonidine 5μg/ml). Clonidine gets systemically absorbed and acts on the local nerve fibres to prolong the duration of analgesia. Inj. Sufentanil i.v was given intraoperatively when there was 20% increase in mean arterial pressure or heart rate .The pain score was checked every 4^{th} hourly post operatively and Inj. Nefopam i.v was given if numerical pain score was more than 4.

They concluded that bilateral superficial cervical plexus block with ropivacaine and clonidine produces better intraoperative analgesia when compared to ropivacaine alone. It also decreases the intraoperative sufentanil requirement and decreases the analgesic requirements after thyroid surgery.

3. Alexandria Journal of Anaesthesia and Intensive Care Vol. (9) No. 2 June 2006;Ashraf A Moussa, Saudi Arabia

They assessed the analgesic efficacy of Bilateral superficial cervical plexus block in the immediate post-operative period after thyroid surgery alone and when combined with bilateral deep cervical plexus block. The patients were divided into 3 groups, with 12 patients in each Group. Group A received bilateral superficial plexus block before surgery with 10 ml of bupivacaine 0.5%. Group B received as in group A along with Bilateral deep cervical plexus block with 5 ml bupivacaine 0.5 %. Group C (Control group) received general anaesthesia for thyroid surgery without any block. With the help of Numeric rating scale (0-10), pain score was assessed during the post-operative period. The main variables that had to be compared were the proportion of patients who were given morphine during the 24 hours postoperatively, numerical rating pain scores and total morphine consumption. Groups A & B had lower pain scores and decreased requirement of morphine when compared to group C.

It was concluded that Bilateral deep cervical plexus block neither decreases the post-operative analgesic requirement nor decreases the intraoperative opioid requirements when combined with bilateral superficial cervical plexus block for pain control after thyroid surgery so superficial cervical plexus block is enough for pain relief.

4. Anesthesia Analgesia 2001; 92:1538–42. Dieudonne et al Superficial cervical blocks after thyroidectomy surgeries.

They had done a study to assess the efficacy of bilateral Superficial cervical plexus block performed at the end of surgery in reducing the post-operative pain. 90 patients who were to undergo elective thyroid surgery under general anesthesia were randomized to receive 20 mL of isotonic Normal saline or 20 mL of Bupivacaine 0.25% with 1:200,000 adrenaline tartrate. Postoperative pain was assessed every 4^{th} hourly by numeric rating scale. Inj. Acetaminophen was given i.v every 6^{th} hourly. Morphine was administered to the patient if NRS-11 score was >4. The variables were pain scores (NRS-11), the proportion of patients who received morphine at any time during the 24-hr period, and the total amount of morphine consumption in the 24 hr period. The Bupivacaine group had fewer patients requiring morphineand also had lower numerical rating pain scores.

They concluded that bilateral superficial cervical plexus blocks decreases the intensity of post-operative pain after thyroid surgery but it does not provide adequate pain relief when done alone.

5. World Journal of Surgery (2010) 34:2338–2343

Ming-Lang et al had conducted a study to evaluate the analgesic efficacy of pre operative bilateral superficial cervical plexus block in patients undergoing thyroidectomy. 162 patients who underwent

elective thyroid operations and were randomly divided into 3 groups. Group A received a bilateral superficial cervical block (12 ml per side) with isotonic Normal saline, Group B received 12ml of Bupivacaine 0.5% on each side and Group C received 12ml of Levobupivacaine 0.5% on each side after induction of general anesthesia. The inhalational anesthetic used was desflurane. Post-operative pain was assessed by Visual analogue scale. The number of patients who required additional postoperative analgesia, the time to the first analgesic requirement, and the pain intensity assessed by visual analogue scale (VAS). Nausea and vomiting is one of the common adverse effects seen within 24 hrs after thyroid surgeries. It was also noted. They had also compared the duration of hospital stay, duration of surgery, if there is any difficulty while swallowing and change in voice between the 3 groups.

They arrived at a conclusion that bilateral superficial cervical plexus block decreases the intraoperative inhalational anesthetics requirement during thyroid surgery and intensity of postoperative pain score and also shortens the duration of stay at the hospital.

6. Brazilian Journal of Otorhinolaryngology 74 (1) January/February 2008,Rui Celso Martins et al

This study was conducted after obtaining ethical committee clearance. It was done to compare the surgeries done under general anaesthesia and under superficial cervical plexus block. Patients who

were to undergo hemithyroidectomy were divided into 2 groups 21 patients in each. Group A received general anaesthesia. Standard general anaesthesia protocol was followed. Group B received Superficial cervical plexus block. Sedation was used prior to the block. Inj.Metaprolol was used to decrease the fluctuations in blood pressure and heart rate intraoperatively. SBP, DBP, SPO2, HR, ETCO2 were monitored. The duration of surgery time was prolonged in Group A when compared to group B .There was increased incidence of bradycardia in group A. The duration of anaesthesia, time in surgery room, treatment costs, and laryngotracheal injury were significantly higher in the general anaesthesia group.

They concluded that Superficial cervical plexus block was effective for the resection of small tumors, at a lower cost and with low incidence of laryngotracheal injuries, when compared to patients undergoing general anaesthesia .

7. Local and Regional Anesthesia 2012, Sandip Mukhopadhyay et al

They conducted study to evaluate the effectiveness of Bilateral superficial cervical plexus block as a sole anaesthetic technique for surgeries in the anterior and anterolateral aspects of the neck. This study was conducted on 136 patients who were to undergo neck surgeries. Sedation was given prior to the block. All patients were administered bilateral superficial cervical plexus block with ropivacaine

hydrochloride 0.5% with 6-7ml on each side. If patient complained of pain during the procedure, Inj. ketamine 25 mg intravenously was given in intermittent doses. The bilateral cervical plexus block as a sole method of anesthesia for surgeries in the anterior and anterolateral aspect of neck with ketamine supplementation in titrated doses seems to be the ideal alternative to general anaesthesia.

They concluded that Bilateral cervical plexus block with ketamine supplementation was more cost effective when compared to general anaesthesia with lower incidence of complications.

8. Anesthesiology 2006; 105: A888, Gilles Lebuffe et al, France

It was done to evaluate the analgesic efficacy of Bilateral Superficial Cervical Plexus Block performed under general anaesthesia in patients who were posted for elective total thyroidectomy. 87 patients were randomized into 3 groups. Group T was to receive BSCPB with saline, Group R was to receive ropivacaine 0.5 % and Group RC was to receive Ropivacaine 0.5% plus clonidine 5µg/ml .Opioid requirement , postoperative rescue analgesic requirement was reduced in ropivacaine group. On admission in the PACU, lower visual analogue pain scores were observed in groups R and RC .

It was concluded that Bilateral superficial plexus block done with ropivacaine and clonidine was more effective anaesthetic technique to

reduce the post thyroidectomy pain. Clonidine improves the intra operative analgesia.

9. British Journal of Surgery ,Volume 97, Issue 7, pages 1000–1006, July 2010; T. Steffenet al

In this study, patients were allocated into 2 groups .Group A received bilateral superficial plexus block with placebo and Group B received bilateral cervical plexus block group with Bupivacaine at the beginning or after the surgery was completed. On the whole, 159 patients were included. The bupivacaine group had significantly lower visual analogue pain scores compared to the placebo group (P = 0·016).Length of hospital stay and number of attempts of rescue analgesics were similar in both groups.

They came to the conclusion that bilateral superficial cervical block with bupivacaine performed under general anaesthesia decreasesthe postoperative pain after thyroid surgeries.

10.European journal of anaesthesiology, 2009 Dec; 26(12):1043-7 ,Young-Jin et al

They evaluated the effectiveness of bilateral superficial cervical plexus block vs. combined superficial and deep cervical plexus block for pain in the line of incision, headache andpain in the posterior aspect

of neck after thyroidectomy procedure. Ninety patients were enrolled into the study.They were divided into 3 groups of 30 each- Group C was the control group, Group S- received bilateral superficial cervical plexus and Group DS received bilateral combined superficial and deep cervical plexus block group.The block was done under general anaesthesia. Remifentanil was the opioid used intraoperatively.HR, SBP, DBP, SPO2, ETCO2 were being monitored.

It was found that the remifentanyl requirement was lower in group S when compared to group C and group DS. In the immediate post-operative period, the opioid and analgesic requirements were significantly reduced in group S ($P < 0.001$).Pain in the posterior aspect of the neck were similar in all the groups. Time of first rescue analgesic was significantly prolonged in group S.

It was concluded that Bilateral Superficial cervical plexus block is superior to combined superficial and deep cervical plexus block in reducing pain after thyroidectomy procedure.

11. M.Messner et al conducted a study in which 46 patients who were to undergo elective unilateral carotid endarterectomy under general anesthesia were divided into 2 Groups of 30 patients each. Group R received unilateral Superficial cervical block with ropivacaine 0.5% and Group P received the superficial cervical plexus block with the placebo

drug. Post-operative pain was assessed by Visual analogue pain scale. Morphine was administered via patient controlled analgesia device when visual analogue pain score >4.

The Ropivacaine group had a significant reduction in total morphine consumption during the stay in the recovery room ($p < 0.05$), decreased maximal pain scores, $p < 0.001$. Patient satisfaction was found to be better in the Ropivacaine group ($p < 0.001$).

They came to a conclusion that superficial cervical plexus block combined with general anaesthesia provides better post-operative analgesia in patients who underwent carotid endarterectomy surgery**.(European journal of vascular and endovascular surgery ,vol 33 , Jan 2007)**

MATERIALS AND METHODS

This was a prospective randomized controlled study. After ethical committee approval and informed consent, the study was conducted in 60 eligible patients after explaining the procedure details to the patients the anaesthetic technique was performed. This study was conducted at Government Rajaji Hospital attached to Madurai medical college.

Selection of patients

INCLUSION CRITERIA:

- Age group 18 - 60 years,
- ASA I-III ,
- Euthyroid patients ,
- Scheduled to undergo thyroidectomy without neck dissection under general balanced anesthesia.

EXCLUSION CRITERIA:

- Clinical history or laboratory tests suggestive of bleeding disorder
- Mental or cognitive deficit in existence, which makes it impossible to understand the patient

visual analogue scale of pain or the study protocol

- Body mass index greater than 35
- History of allergy to local anesthetics
- Skin infection at the site of the procedure
- Patients requiring neck dissection
- Patients with sub sternal goitre
- Pregnancy
- Preoperative use of opioid analgesics or non-opioids, corticosteroids or non-steroidal anti-inflammatory drugs
- Need for emergency reintervention within the first 24 hours postoperatively.

Preoperative preparation

Preoperative assessment of the patients included, history regarding the symptoms and their severity, other associated systemic illness, and history of previous surgery. A systematic examination of the cardiovascular and respiratory system was done. The neck of the patient was examined for adequate flexion and extension and assessment of the airway was done. Apart from the basic preoperative investigations like blood hemoglobin, sugar, urea, creatinine, specific investigations like

serum electrolytes, chest X-ray, X-ray Neck AP and Lateral view to rule out tracheal compression, electrocardiogram, and echocardiography were done.

Thyroid function test was done for all patients and euthyroid status was assessed. Endocrinologist opinion was obtained for all patients. ENT surgeon opinion regarding vocal cords movements was also taken.

On the day of surgery patients were given their regular thyroid/antithyroid drugs orally with sips of water in the morning. The patients were premedicated with Glycopyrrolate 4µg/kg and Midazolam 0.05mg/kg intramuscularly thirty minutes prior to anaesthesia.

Two groups:

STUDY GROUP: Bilateral Superficial Cervical Plexus Block with BUPIVACAINE 0.25% 10ml on each side.

CONTROL GROUP: Bilateral Superficial Cervical Plexus Block with NORMAL SALINE 10 ml on each side.

Procedure details

After arrival into the operation theatre pre induction monitors like noninvasive blood pressure monitor, electrocardiography, pulse oximetry (multiparameter monitor was used) were connected and the baseline readings were noted down.

Intravenous cannula was secured in left hand. **Block was performed 20 minutes prior to induction using Landmark technique.**

Patient positioning– Patient put on supine posture with head turned to opposite side. Neck and upper chest was exposed to assess the relative length and position of sternocleidomastoid muscle. Under strict aseptic precautions parts painted and draped. After identifying the midpoint of posterior border of sternocleidomastoid muscle, local infiltration is given to entry point then ten ml of solution (either Bupivacaine 0.25% or Normal Saline) given subcutaneously in a fan shaped manner along the posterior border of sternocleidomastoid.6 ml in up and down direction and 4ml just above the muscle horizontally to block all the 4 terminal branches .The same thing performed on other side also. So totally 20 ml of 0.25% bupivacaine or 20 ml of normal saline was used. After waiting for onset time of around 10 – 15 minutes the blockade was assessed by pin prick by a separate assistant.

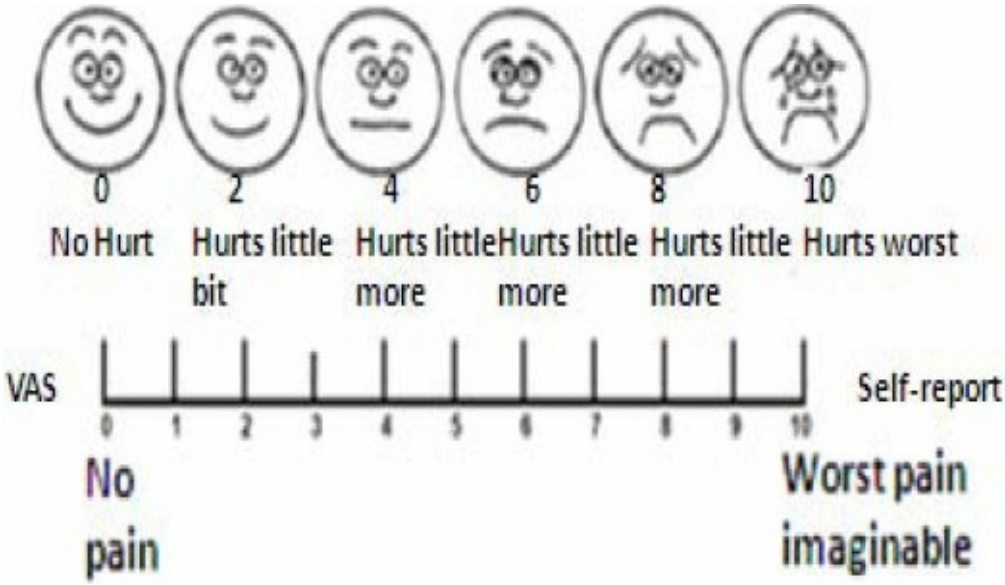
All patients were preoxygenated with 100% oxygen for 3 minutes and induced with fentanyl citrate 2 µg/kg IV and propofol 2 mg/kg IV. Lignocaine hydrochloride 1.5mg/kg was given 90 seconds before intubation for stress attenuation. Succinylcholine chloride 1.5mg/kg was given for endotracheal intubation.

Intravenous Loading dose of Atracurium besylate 0.5mg/kg was given. Dexamethasone 8mg IV was given to all patients. Anaesthesia was maintained with nitrous oxide and oxygen in the ratio 66%:33% and sevoflurane 2%. Atracurium besylate infusion 0.5mg/kg/hr was started. If mean arterial pressure or heart rate rises by more than 20% above basal values which was monitored using multiparameter monitor, additional Inj. Fentanyl citrate dose of 0.5 µg /kg was given.

Intraoperative monitoring was done using multipara monitor which includes pulse rate, saturation, and Blood pressure including MAP, End tidal carbon dioxide which was maintained around 30 – 35 mmHg and Electrocardiography. Patients were reversed after adequate respiratory attempts and extubated.

After extubation, laryngoscopy was done to evaluate the vocal cord movements and then patient was transferred to recovery room or post anaesthetic care unit.

In PACU pain was assessed by using visual analogue scale score immediately (H0),afterwards three hourly for the next twelve hours (H3,H6,H9,H12) and every six hrs until twenty four hours(H18,H24) .Patients stayed for 2 hours in recovery room then shifted to Surgical Intensive Care Unit .



If VAS ≥ 40mm, Morphine 1 – 2 mg given IV,then patients were assessed every 10 minutes until **VAS** becomes **<40mm.**

Post operatively patients were monitored for any episodes of:

- Bradycardia
- Hypotension
- Nausea
- Vomiting
- Excessive Sedation
- Respiratory depression- respiratory rate and oxygen saturation was monitored.

Hypotension : fall of more than 30% from the baseline blood pressure or the systolic blood pressure less than 90mmHg, it was treated with fluids, vasopressors as necessary.

Bradycardia:if rate goes below 50/minute atropine was used.

Sedation: Ramsay sedation score (1 -6) :

Patient awake:

- Anxious and Agitated - 1
- Oriented and comfortable - 2
- Follows command only - 3

Patient sleeping:

- Response is brisk to glabellar tap/loud auditory stimuli - 4
- Response is sluggish - 5
- Response is absent - 6

Any adverse event related to surgery & regional anaesthetic technique was also recorded.

STATISTICAL TOOLS

The information collected regarding all the selected cases were recorded in a Master Chart. Data analysis was done with the help of computer using **Epidemiological Information Package (EPI 2010)** developed by Centre for Disease Control, Atlanta.

Using this software range, frequencies, percentages, means, standard deviations, chi square and 'p' values were calculated. Two types of chi square test were used to calculate the significance. Kruskul Wallis test was used for quantitative variables and Yates test for qualitative variables. A relationship was significant if p value is less than 0.05.

OBSERVATIONS AND RESULTS

STUDY GROUP: Bilateral Superficial Cervical Plexus Block with BUPIVACAINE 0.25% 10ml on each side.

CONTROL GROUP: Bilateral Superficial Cervical Plexus Block with NORMAL SALINE 10 ml on each side.

Complications of the procedure like vascular puncture, hematomas, etc. if occurred were noted down. Only successful blocks were considered for study group.

Baseline, intraoperative and postoperative pulse rate, blood pressure, oxygen saturation were monitored using multipara monitor.

In the intra operative period, the total dose of intraoperative opioid requirement used was recorded and compared.

In the postoperative period number of patients having VAS $\geq$ 40mm at H0, morphine requirement in post anaesthetic care unit and in surgical intensive care unit and its dosage and total patients requiring morphine were recorded and compared

CHARACTERISTICS OF CASES STUDIED

Table 1: Age distribution

Age group	Study group		Control group	
	No	%	No	%
Less than 30 years	2	6.7	7	23.3
30-39 years	12	40	10	33.3
40-49 years	9	30	7	23.3
50 & above	7	23.3	6	20
Total	30	100	30	100
Range	23-55 years		20-60 years	
Mean	39.9 years		37.8 years	
SD	8.7 years		11.3 years	
'p'	0.3781 **Not significant**			

Study group had an age of 39.9 ± 8.7 years while Control group had 37.8 ± 11.3 years. The difference was not statistically significant.

AGE DISTRIBUTION

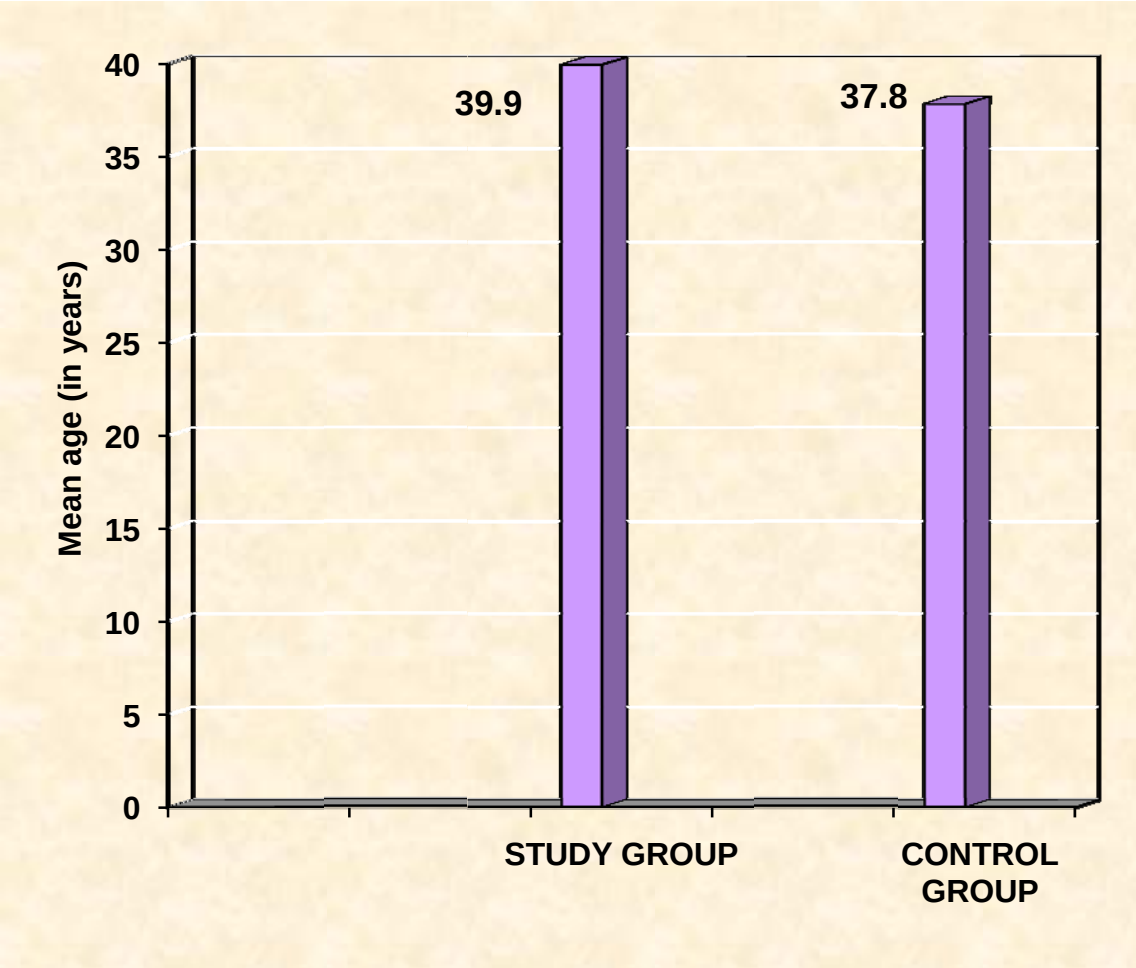


Table 2: Sex distribution

Sex	Study group		Control group	
	No	**%**	**No**	**%**
Male	4	13.3	5	16.7
Female	26	86.7	25	83.3
'p'	0.5 **Not significant**			

Nearly 90% of the patients were female. Sex composition of both the groups did not have significant difference.

SEX DISTRIBUTION

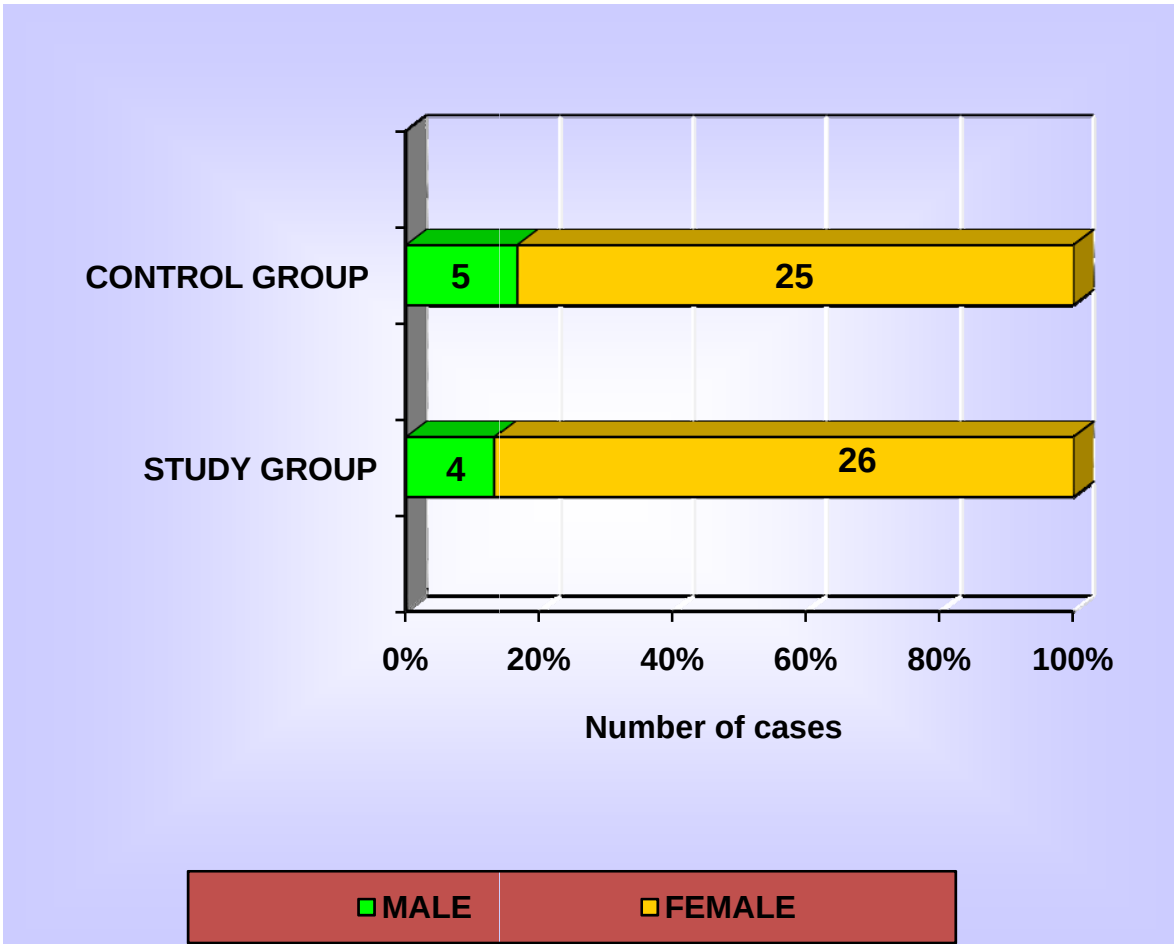


Table 3: Weight

Group	Weight in kgs		
	Range	**Mean**	**SD**
Study group	44-64	51.3	4.8
Control group	44-64	51.5	5.2
'p'	0.9055 **Not significant**		

Mean weight of the Study Group was 51.3kgs and the Control Group was 51.5kgs. Not statistically significant ('p' value= 0.9055).

WEIGHT

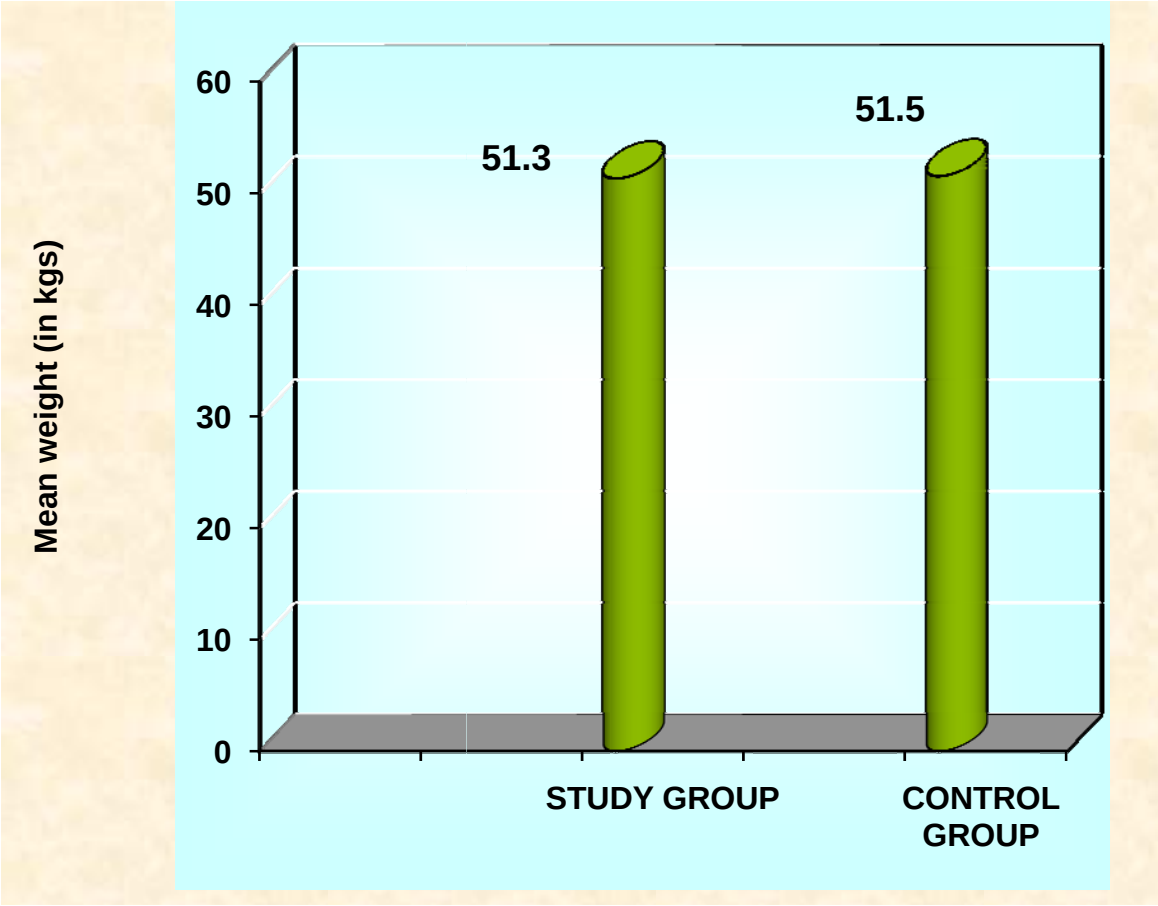

Mean weight (in kgs)
60
50
40
30
20
10
0
51.3
51.5
STUDY GROUP
CONTROL GROUP

Table 4: ASA

ASA	Study group		Control group	
	No	%	No	%
II	29	96.67	29	96.67
III	1	3.33	1	3.33
Total	30	100	30	100

96.67% of patients in both groups belong to ASA II.

Table 5: Diagnosis

Diagnosis	Study group		Control group	
	No	**%**	**No**	**%**
Ca. Thyroid	1	3.3	1	3.3
MNG	23	76.7	26	86.7
MNG (T)	5	16.7	2	6.7
SNG	-	-	1	3.3
SNG R (T)	1	3.3	-	-
In total	30	100	30	100

Most patients were having Multi Nodular Goiter (MNG) and underwent subtotal/near-total thyroidectomy. 5 MNG and 1 SNG patients underwent (T)total thyroidectomy.

DIAGNOSIS

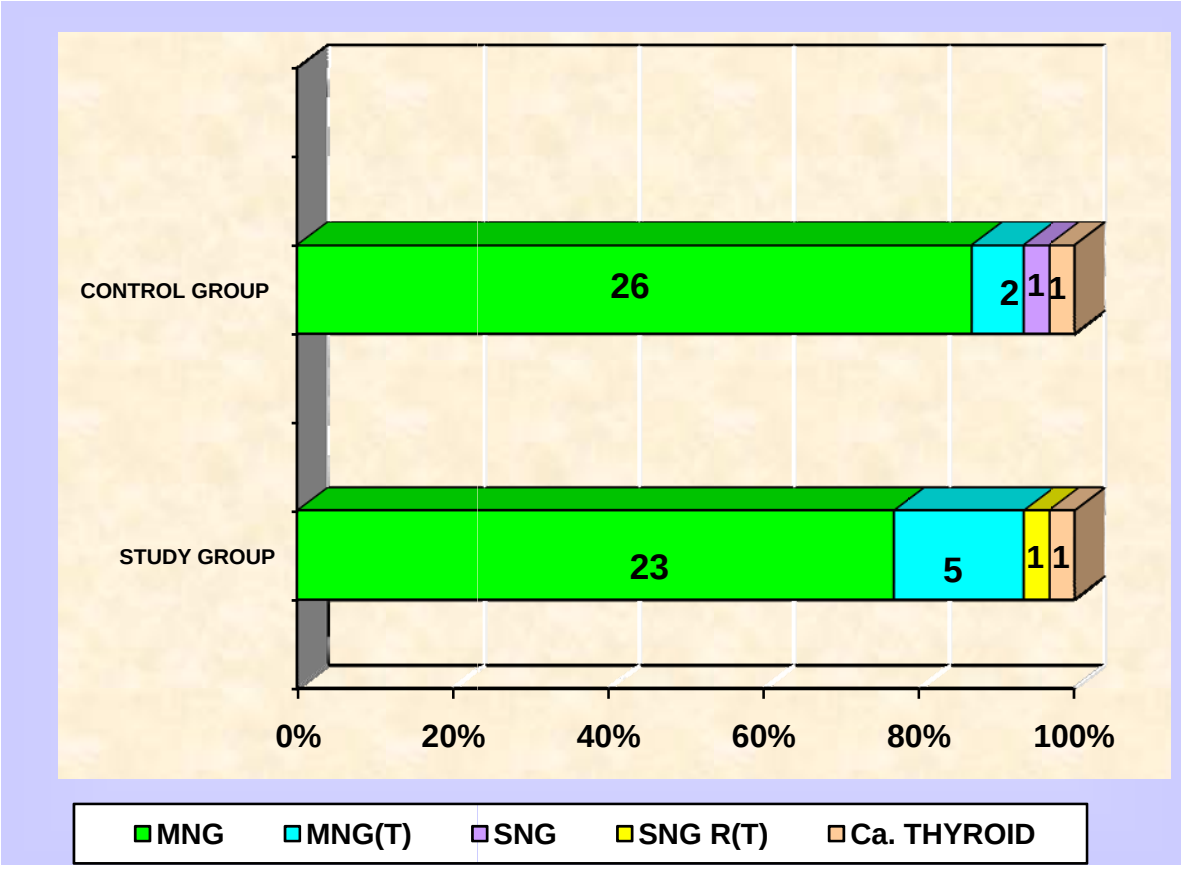

CONTROL GROUP
26
2
1
1
STUDY GROUP
23
5
1
1
0%
20%
40%
60%
80%
100%
MNG
MNG(T)
SNG
SNG R(T)
Ca. THYROID

Table 6: Duration of surgery

Group	Duration of surgery (in minutes)		
	Range	**Mean**	**SD**
Study group	85-120	100.3	7.6
Control group	85-120	101	7.6
'p'	0.7111 **Not significant**		

Mean duration of surgery in study group was 100.3 minutes and in control group was 101 minutes. It was not statistically significant ('p' value= 0.7111).

DURATION OF SURGERY

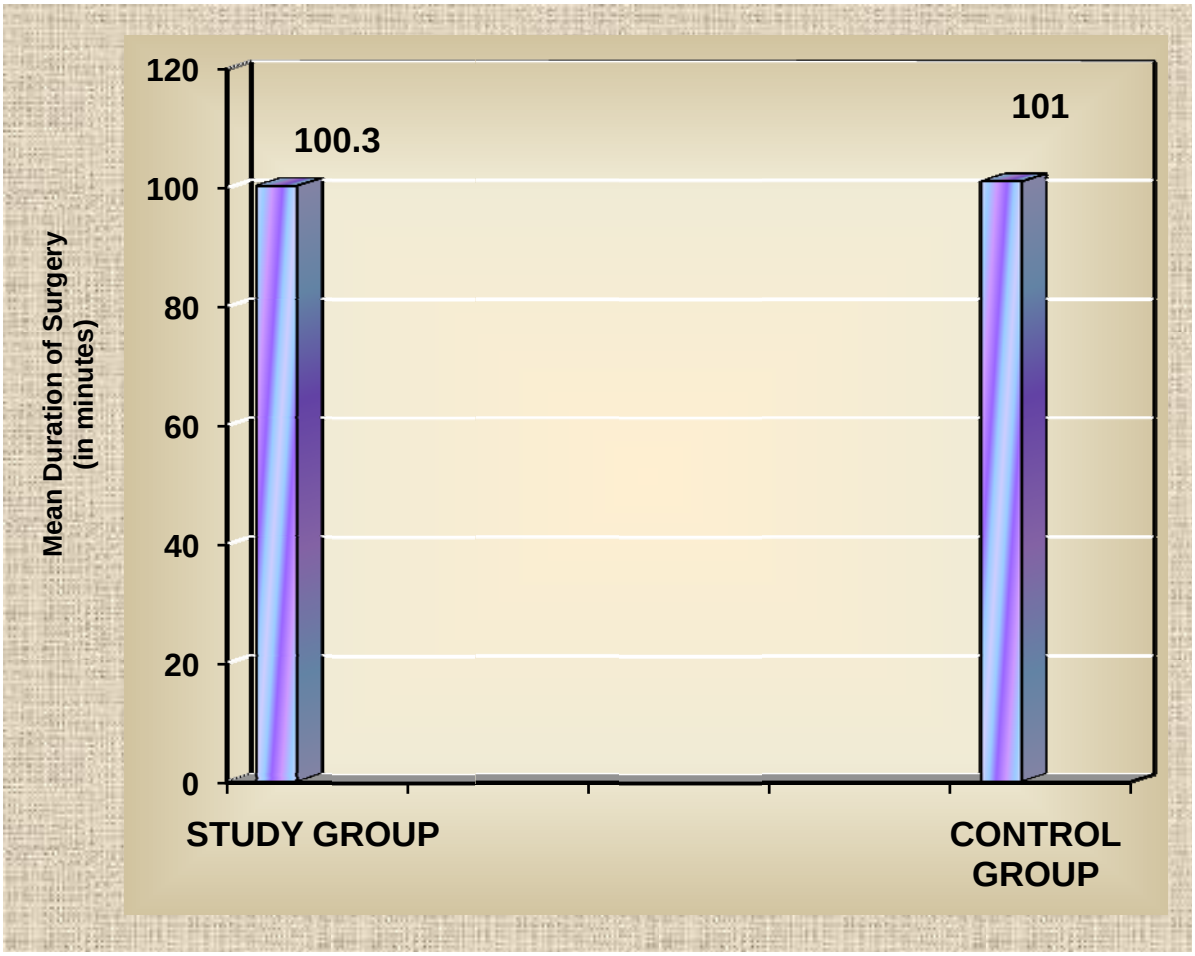


Table 7: Duration of Anaesthesia

Group	Duration of Anaesthesia(in minutes)		
	Range	**Mean**	**SD**
Study group	110-140	121.7	7.1
Control group	110-140	123.3	7.8
'p'	0.3342 **Not significant**		

Mean duration of anaesthesia in study group was 121.7 minutes and in control group it was around 123.3 minutes which was not statistically significant (p value= 0.3342).

DURATION OF ANAESTHESIA

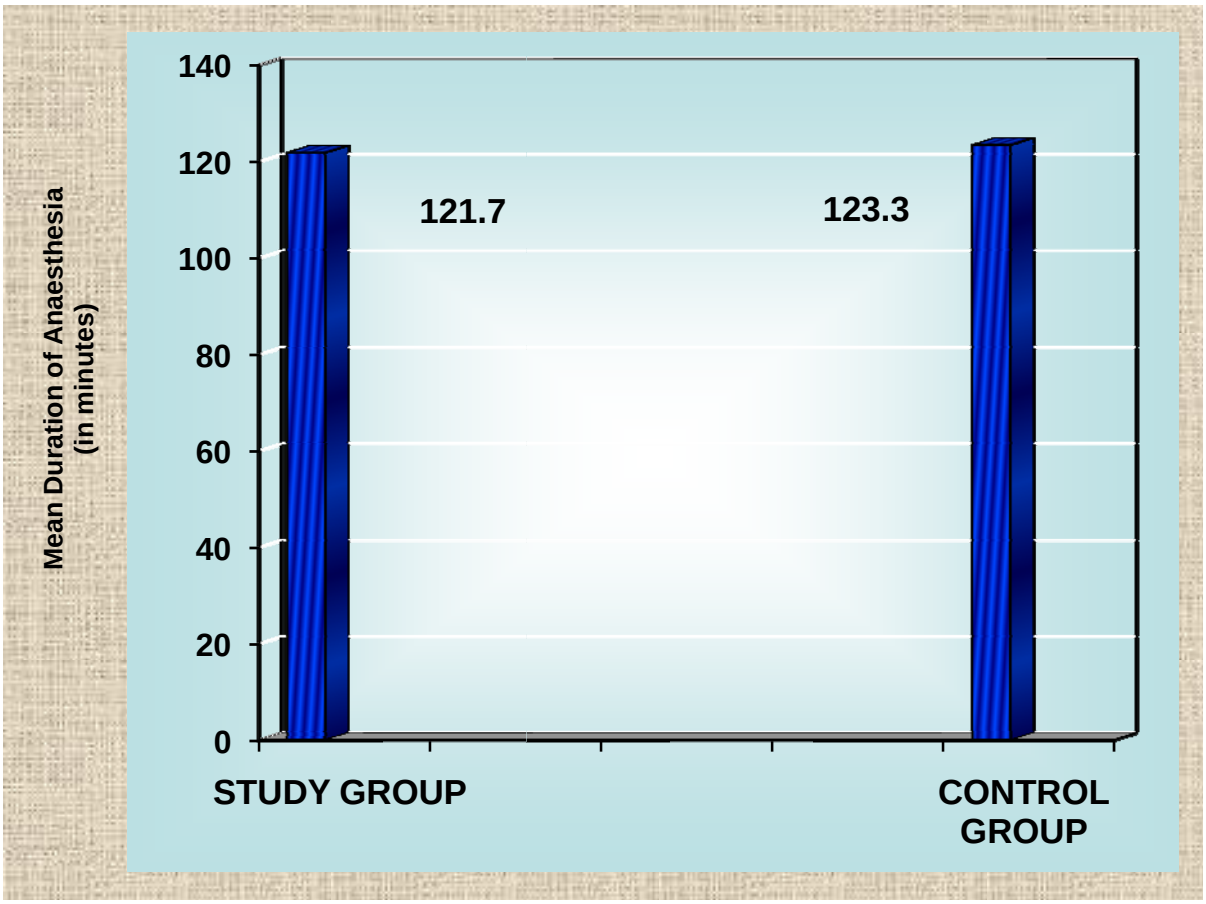


Table 8: Base line Hemodynamic variables

Variables	Study Group		Control Group		'p'
	No	%	No	%	
Pulse rate(/minute)	82.0	9.6	81.7	9.4	**0.935** **Not significant**
Systolic BP(mmhg)	117.2	13.4	119.2	12.5	**0.4552** **Not significant**
Diastolic BP(mmhg)	71.9	8.3	73.0	8.7	**0.6481** **Not significant**
SPO2(%)	98.5	0.7	98.5	0.7	**0.8418** **Not significant**

Base line hemodynamic variables were comparable between the two groups with p value being statistically not significant .

BASE LINE HEMODYNAMIC VARIABLES

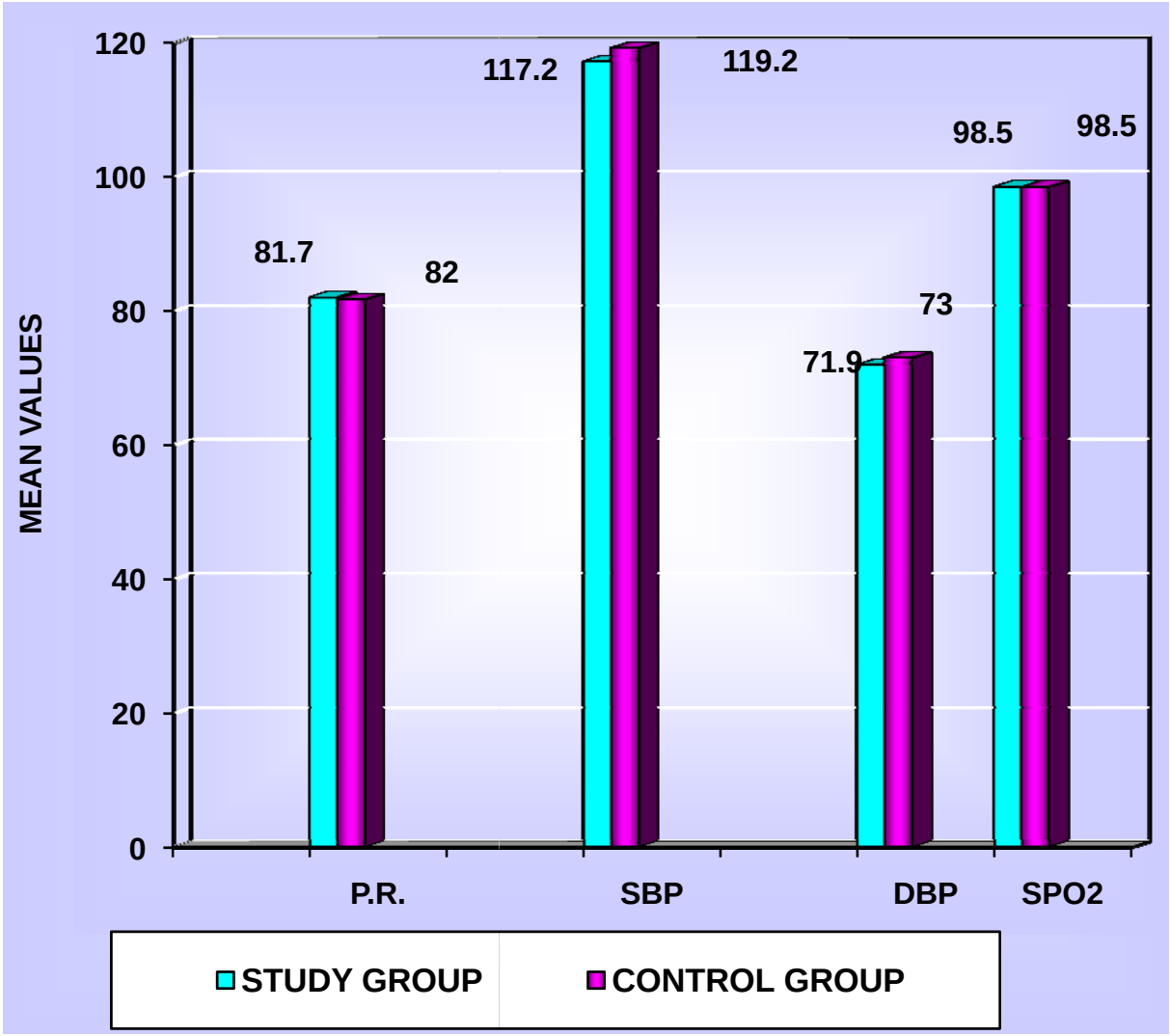


Table 9: Intra operative Fentanyl Requirement

Group	Intra operative Fentanyl (in micrograms)		
	Range	**Mean**	**SD**
Study group	70-100	79.7	8.7
Control group	110-170	132.5	14.2
'p'	**0.0001** **Significant**		

Intraoperative fentanyl requirement in study group was 79.7 ± 8.7µg and in control group was 132.5 ± 14.2µg which was statistically significant ('p' value is 0.0001).

INTRA OPERATIVE FENTANYL

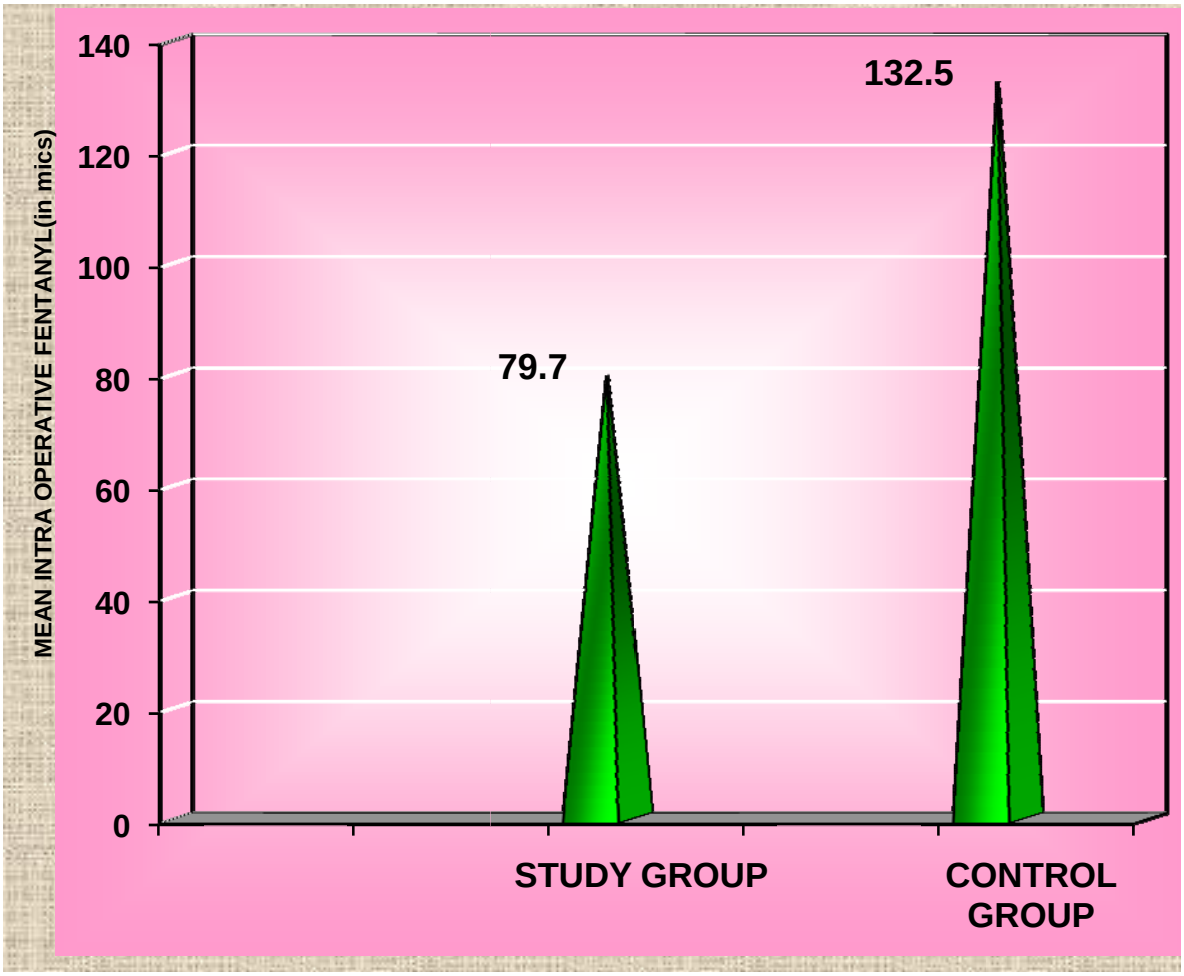


Table 10: VAS score > 40 mm in PACU (0 hour)

Group	VAS > 40 mm in PACU (0 hour)			
	Yes		No	
	No	%	No	%
Study group	5	16.7	25	83.3
Control group	21	70	9	30
'p'	0.0001 Significant			

70% patients in control group had VAS score of > 40mm in immediate post-operative period compared to 16.7% in study group which was very much statistically significant (p value 0.0001).

VAS > 40MM IN PACU (0 HOUR)

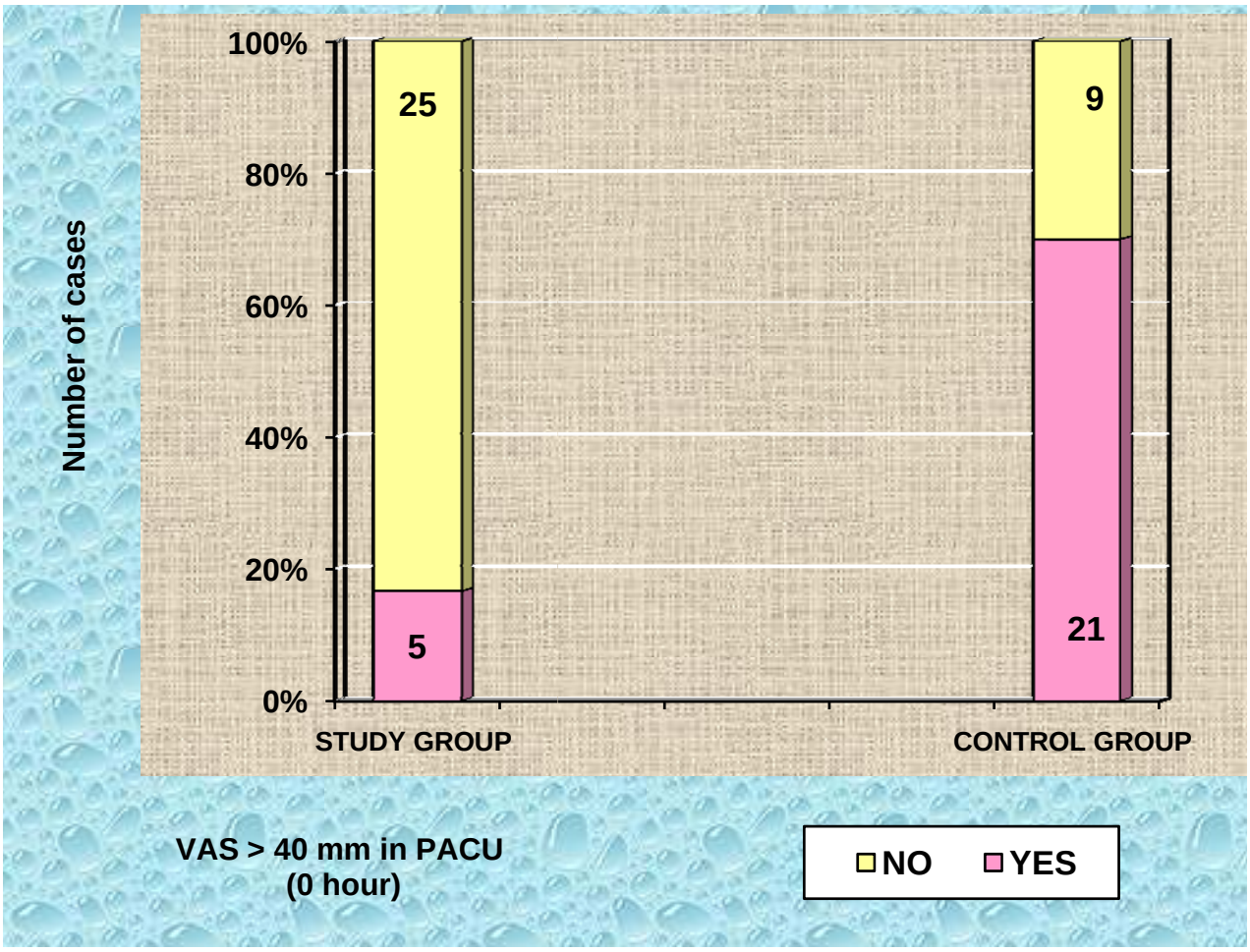


Table 11: Morphine Requirement.

Group	Morphine dose in milligrams					
	In PACU		In SICU		Total dose(upto 24hours)	
	Mean	SD	Mean	SD	Mean	SD
Study group	0.83	1.93	1.97	2.37	2.8	3.6
Control group	6.13	3.59	5.07	1.74	11.2	4.1
'p'	**0.0001 Significant**		**0.0001 Significant**		**0.0001 Significant**	

There was statistically significant difference between the two groups in morphine requirements in post anaesthetic care unit, surgical intensive care unit and also in 24hour dose requirements. Study group required less morphine than control group (p value 0.0001).

MORPHINE REQUIREMENT

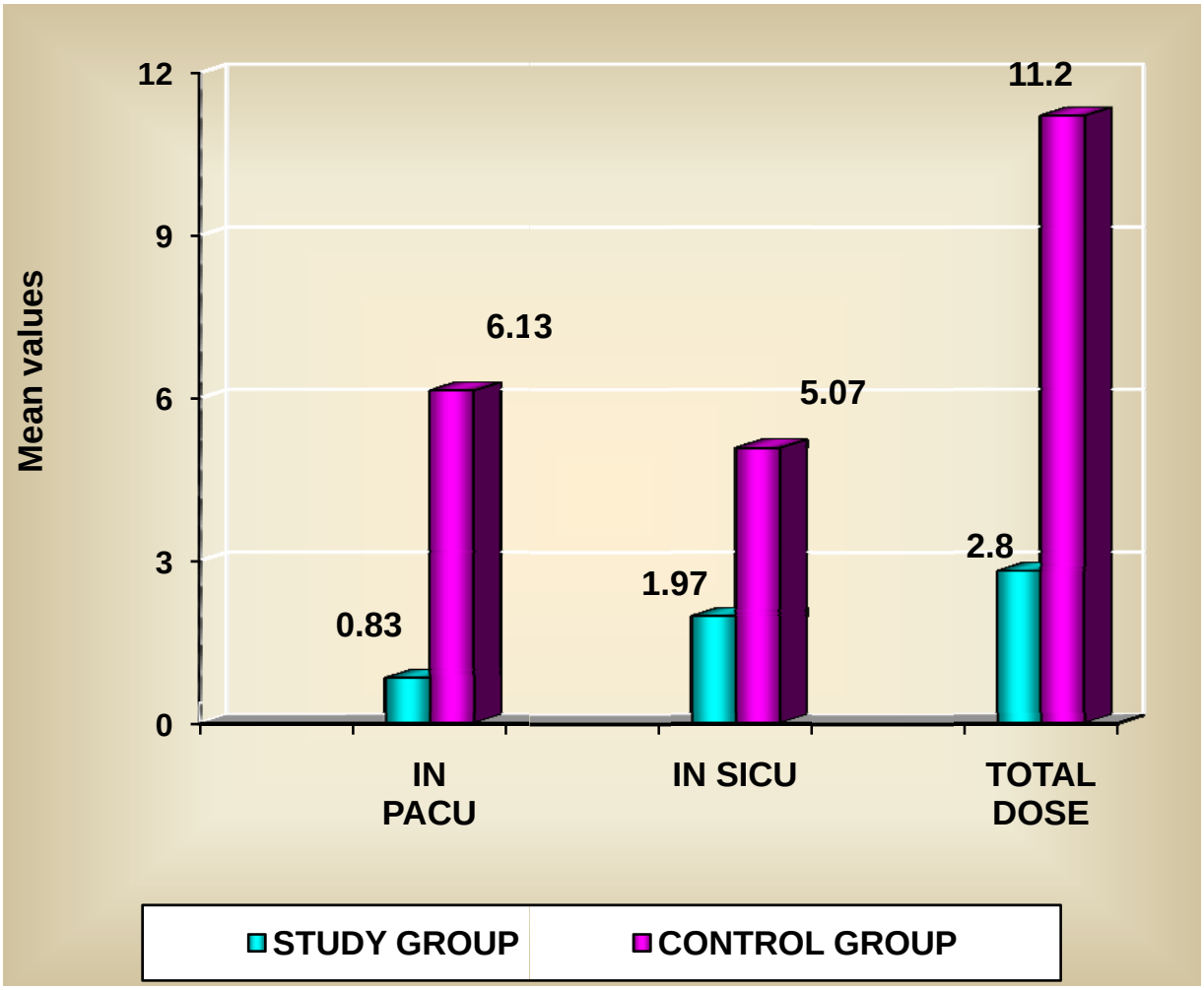


Table 12: Total number of patients requiring morphine in first 24 hrs postoperatively

Group	MORPHINE requirement(up to 24 hours)			
	Yes		No	
		%		%
Study group	13	43.3	17	56.7
Control group	28	93.3	2	6.7
'p'	0.0001 Significant			

93.3% patients in the control group required morphine in the first 24 hours postoperatively compared 43.3% patients in study group.

TOTAL NUMBER OF PATIENTS REQUIRING MORPHINE

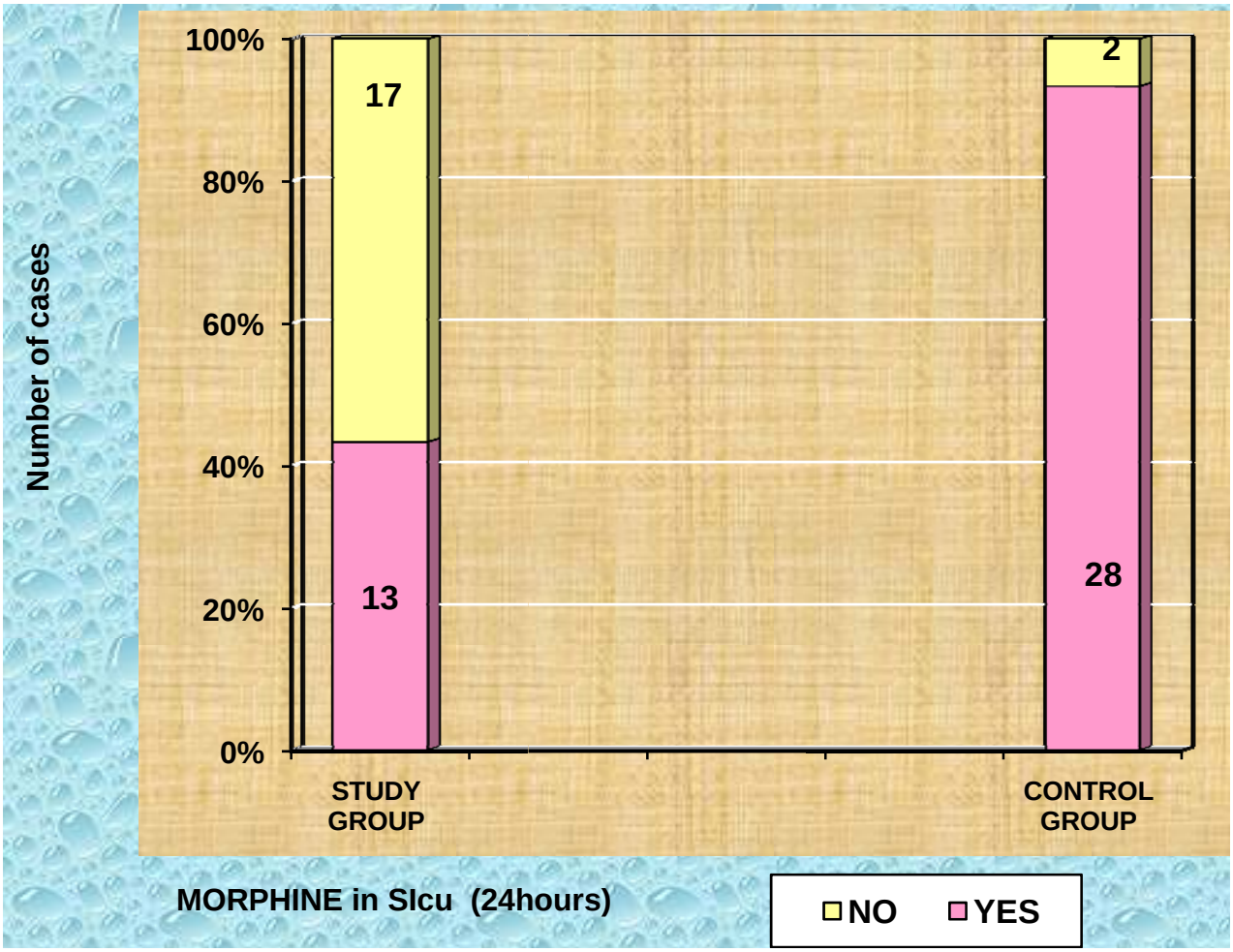


Table 13: Incidence of post-operative vomiting

Group	Post-operative vomiting			
	Yes		No	
		%		%
Study group	5	16.7	25	83.3
Control group	8	26.7	22	73.3
'p'	0.5308 **Not significant**			

Even though 26.7% patients in control group had post-operative vomiting it was not statistically significant in relation to study group ('p' value 0.5308).

POST OPERATIVE VOMITING

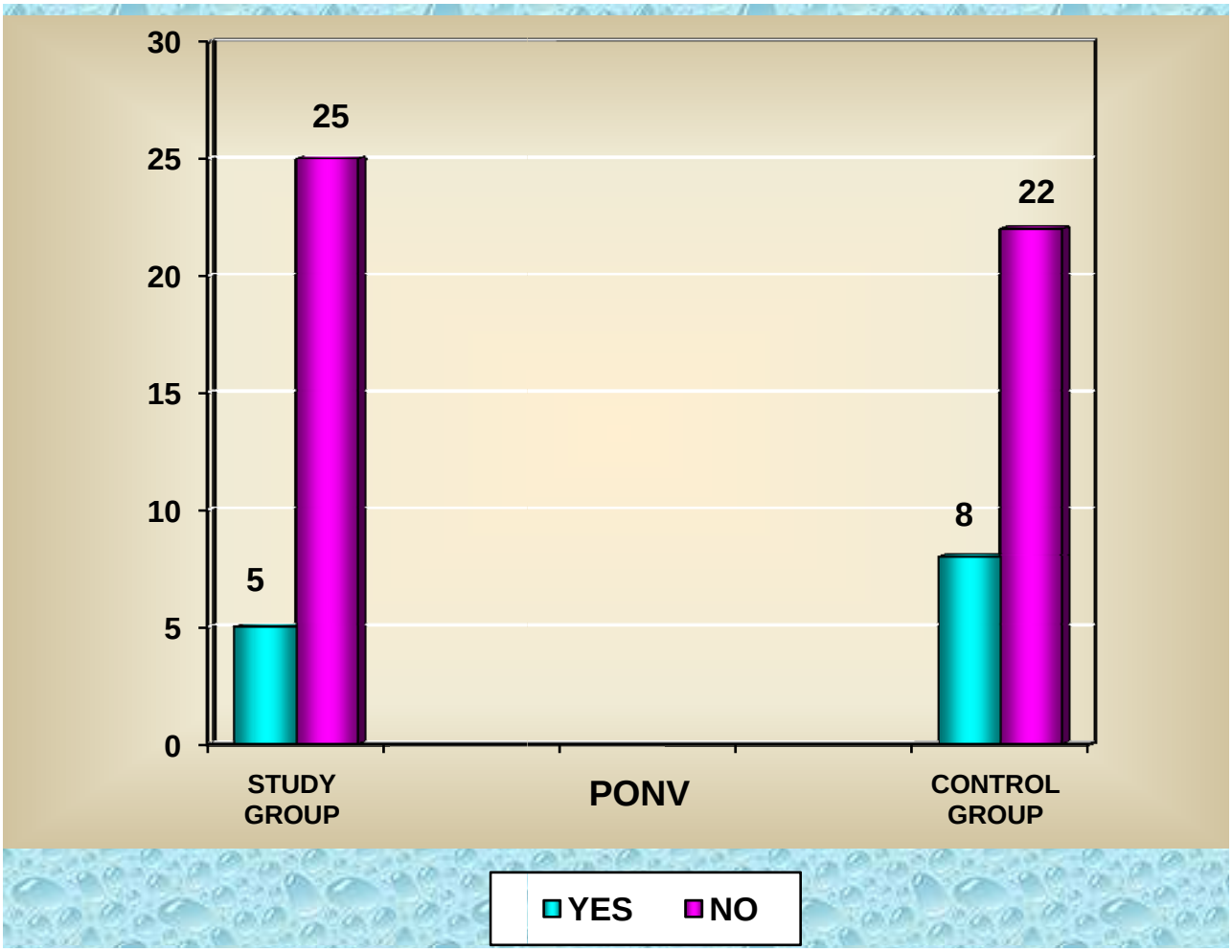


Table 14: Sedation score (Ramsay Sedation Score)

Sedation score	Study group		Control group	
	No	%	No	%
2	30	100	26	86.7
3	-	-	4	13.3
'p'	0.0562 **Not significant**			

Only13.3% patients in control group had sedation score of 3. Rest of the patients had a score 2 in both groups.

SEDATION SCORE

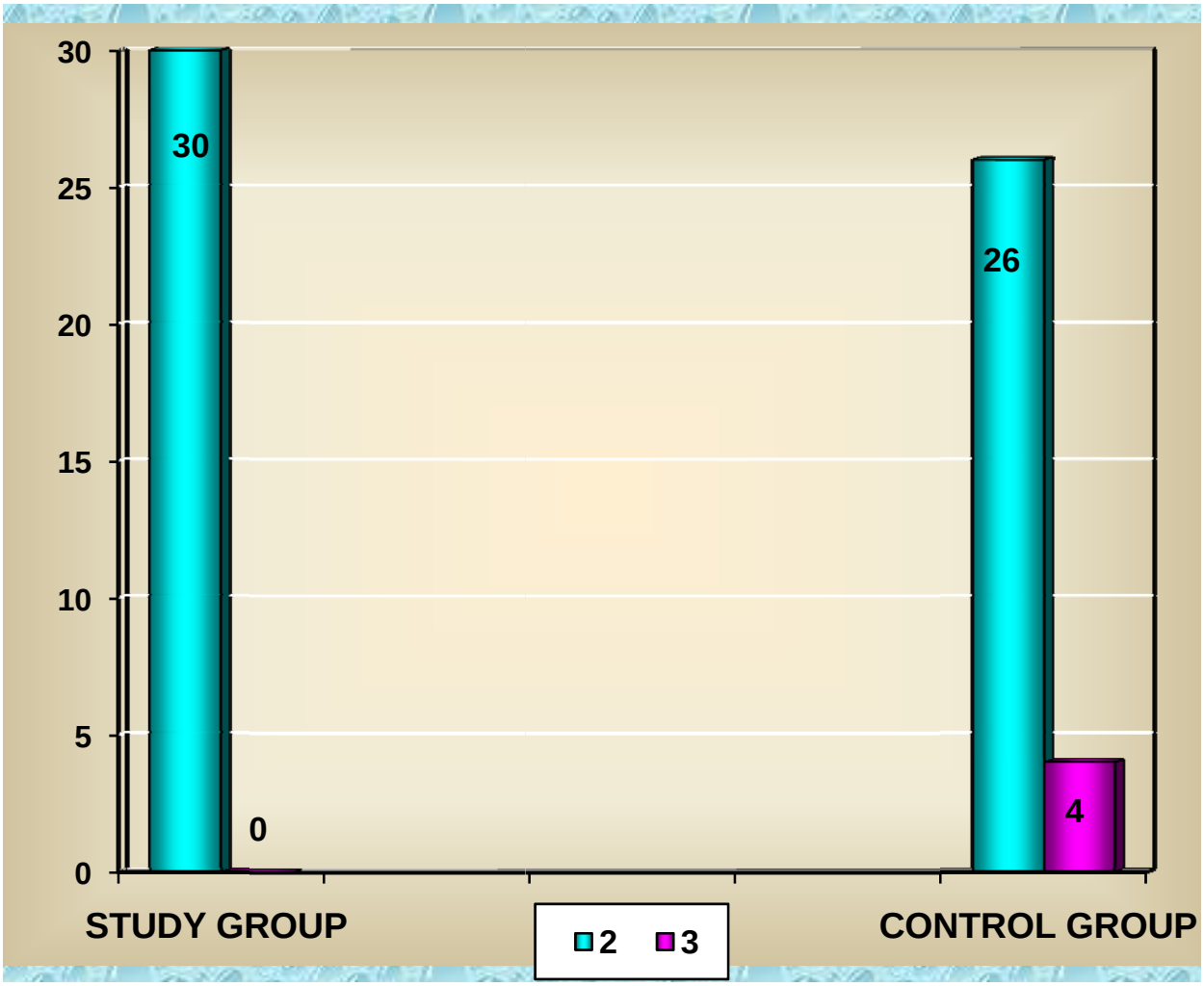


Table 15: Post operative changes in pulse rate

Pulse rate/minute at	Study Group		Control Group		'p'	Significance
	Mean	SD	Mean	SD		
0 minute	83.9	8.0	84.3	9.2	0.8471	**Not significant**
30 minutes	86.7	8.5	83.6	9.2	0.1824	**Not significant**
1 hour	86.9	8.0	86.0	8.9	0.7612	**Not significant**
2 hours	84.7	8.4	86.6	8.3	0.3577	**Not significant**
3 hours	87.5	6.8	87.4	8.3	0.8297	**Not significant**
6 hours	86.6	8.0	87.3	9.0	0.767	**Not significant**
9 hours	87.5	8.5	85.3	8.5	0.2827	**Not significant**
6 hours	85.8	8.6	89.7	7.0	0.0696	**Not significant**
12 hours	85.6	8.5	86.0	8.9	0.7612	**Not significant**
18 hours	82.0	8.8	86.6	8.3	0.3577	**Not significant**
24 hours	87.5	8.5	85.3	8.5	0.2827	**Not significant**

Post operative changes in pulse rate were comparable in both groups.

POST OPERATIVE CHANGES IN PULSE RATE

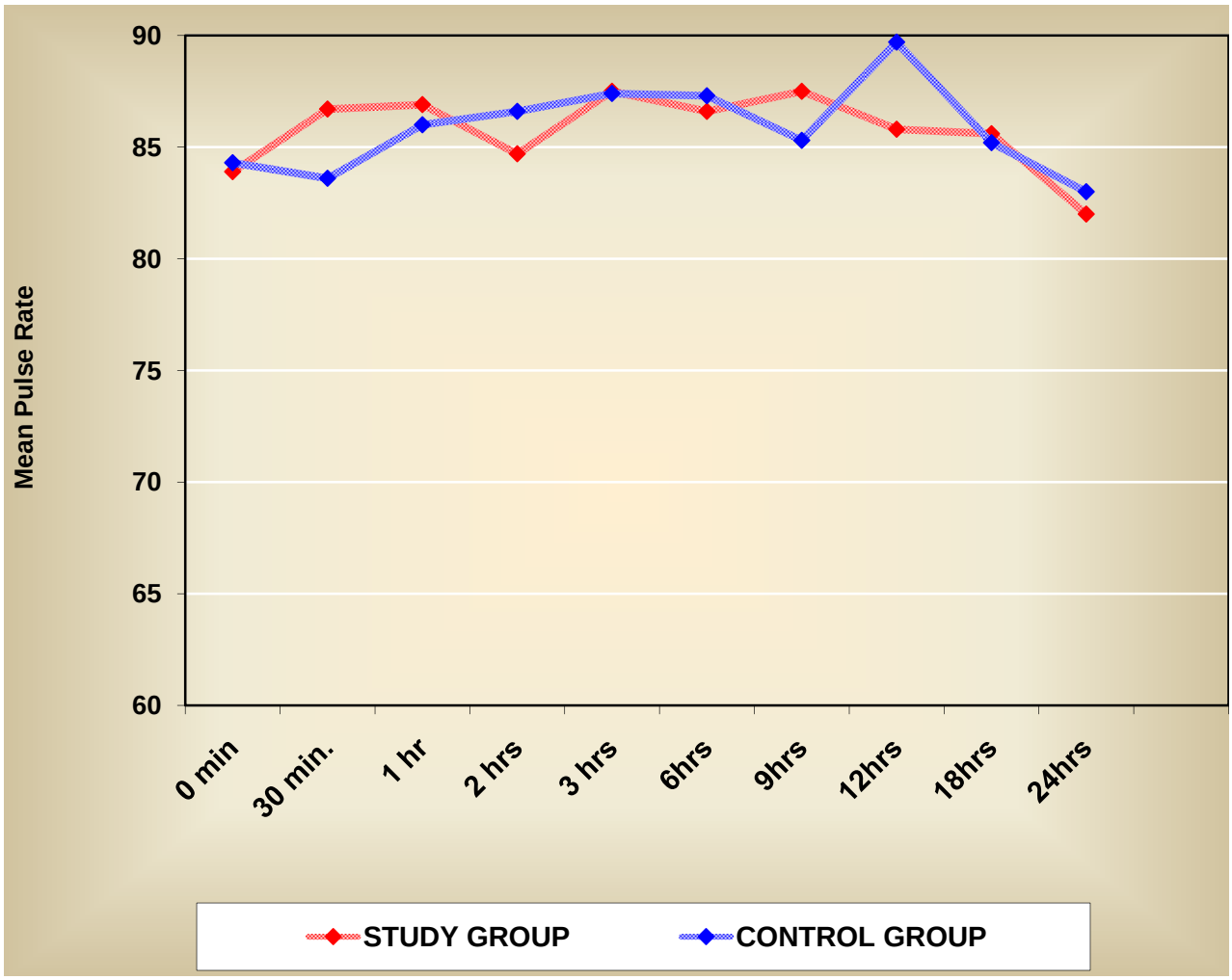


Table 16: Changes in systolic blood pressure

SBP at	SBP(mmHg) in				'p'	Significance
	Study Group		Control Group			
	Mean	SD	Mean	SD		
0 minute	112.5	10.2	115.3	9.7	0.2504	**Not significant**
30 minutes	111.9	9.8	113.8	10.3	0.4495	**Not significant**
1 hour	112.3	8.9	114.3	8.9	0.342	**Not significant**
2 hours	110.1	9.4	113.7	9.7	0.1174	**Not significant**
3 hours	113.3	9.0	114.5	10.1	0.8295	**Not significant**
6 hours	113.8	8.8	114.7	10.5	0.7215	**Not significant**
9 hours	113.5	8.7	116.8	8.7	0.1527	**Not significant**
12 hours	112.7	9.1	114.7	10.5	0.5727	**Not significant**
18 hours	115.9	9.0	114.3	8.9	0.342	**Not significant**
24 hours	113.5	8.8	113.7	9.7	0.1174	**Not significant**

There was no statistically significant difference in systolic blood pressure changes between the two groups.

CHANGES IN SYSTOLIC BLOOD PRESSURE

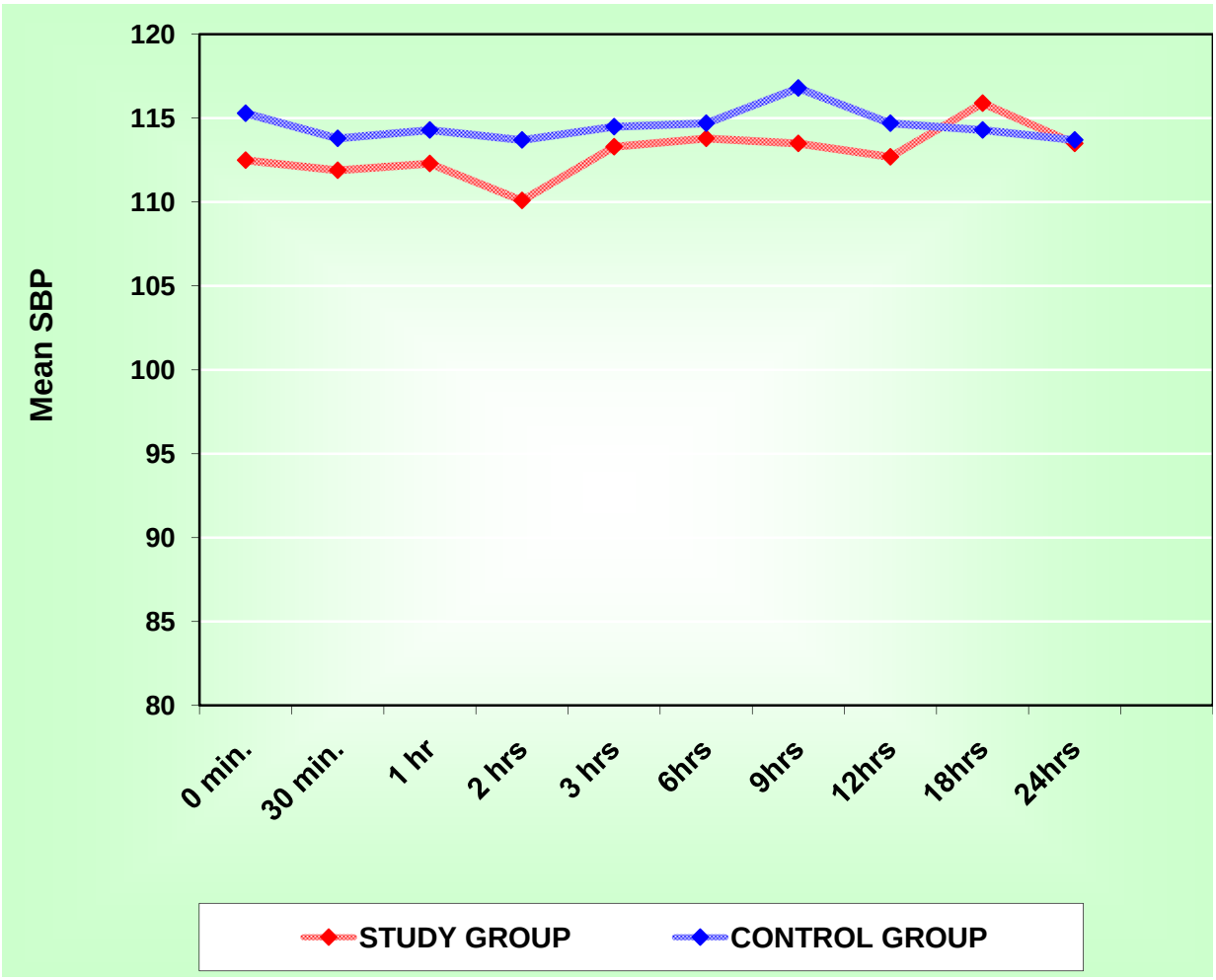


Table 17: Changes in diastolic blood pressure

DBP at	DBP(mmHg) in				'p'	Significance
	Study Group		Control Group			
	Mean	SD	Mean	SD		
0 minute	73.8	8.6	70.5	7.0	0.1707	**Not significant**
30 minutes	75.2	9.0	73.9	8.2	0.5772	**Not significant**
1 hour	71.1	8.0	72.2	7.4	0.6013	**Not significant**
2 hours	74.7	8.7	74.3	8.4	0.8817	**Not significant**
3 hours	72.0	7.0	72.8	8.6	0.9941	**Not significant**
6 hours	72.7	8.6	72.6	7.9	0.8338	**Not significant**
9 hours	71.8	6.5	74.9	8.7	0.1733	**Not significant**
12 hours	75.5	9.7	71.0	7.2	0.083	**Not significant**
18 hours	74.7	10.8	74.3	8.4	0.8817	**Not significant**
24 hours	70.6	8.5	72.8	8.6	0.9941	**Not significant**

There was no statistically significant difference in diastolic blood pressure changes between the two groups.

CHANGES IN DIASTOLIC BLOOD PRESSURE

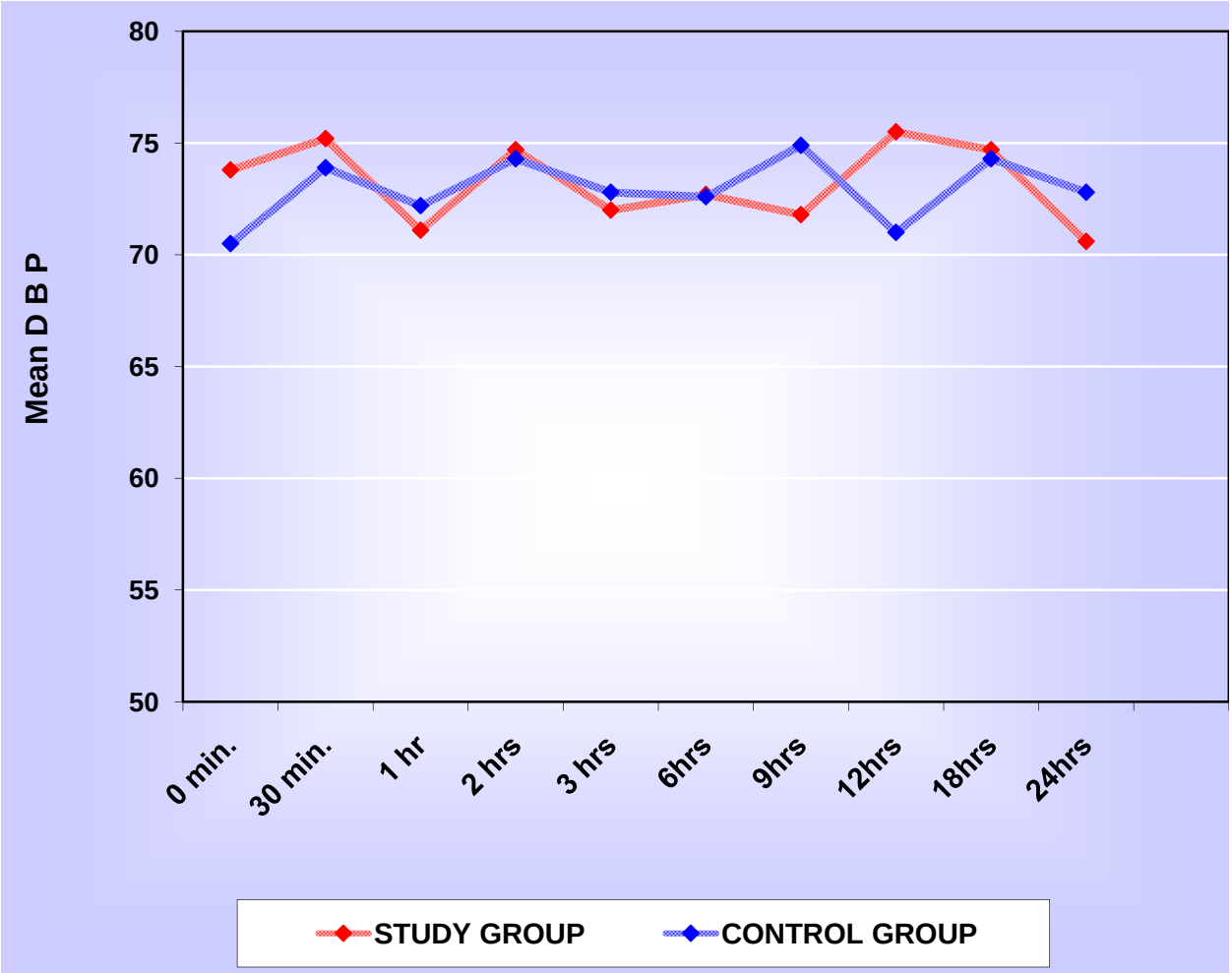


Table 18: Changes in respiratory rate/ minute

Respiratory rate at	Study Group		Control Group		'p'	Significance
	Mean	SD	Mean	SD		
0 minute	13.7	0.6	13.8	1.1	0.6221	**Not significant**
30 minutes	13.9	1.0	13.7	0.7	0.35	**Not significant**
1 hour	13.8	1.1	13.1	1.0	0.0645	**Not significant**
2 hours	13.7	1.0	13.8	0.9	0.7432	**Not significant**
3 hours	13.7	1.0	13.8	1.0	0.4491	**Not significant**
6 hours	13.8	1.1	13.9	0.8	0.8212	**Not significant**
9 hours	13.7	0.6	13.8	0.9	0.6148	**Not significant**
12 hours	13.9	1.1	13.9	1.1	1.0	**Not significant**
18 hours	13.9	1.2	13.1	1.0	0.0645	**Not significant**
24 hours	13.7	0.8	13.8	0.9	0.7432	**Not significant**

There was no statistically significant difference in respiratory rate changes between the two groups.

CHANGES IN RESPIRATORY RATE/ MINUTE

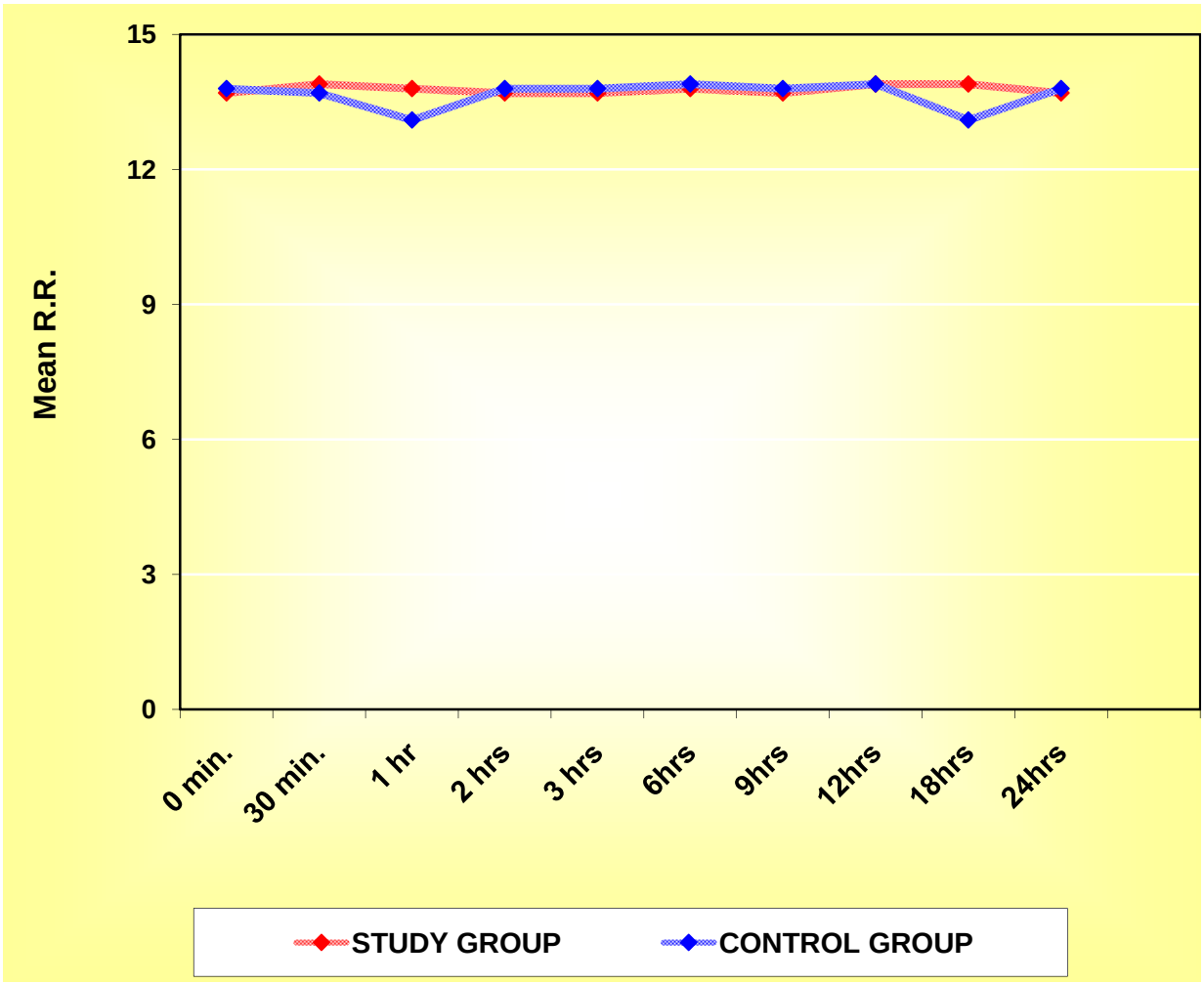
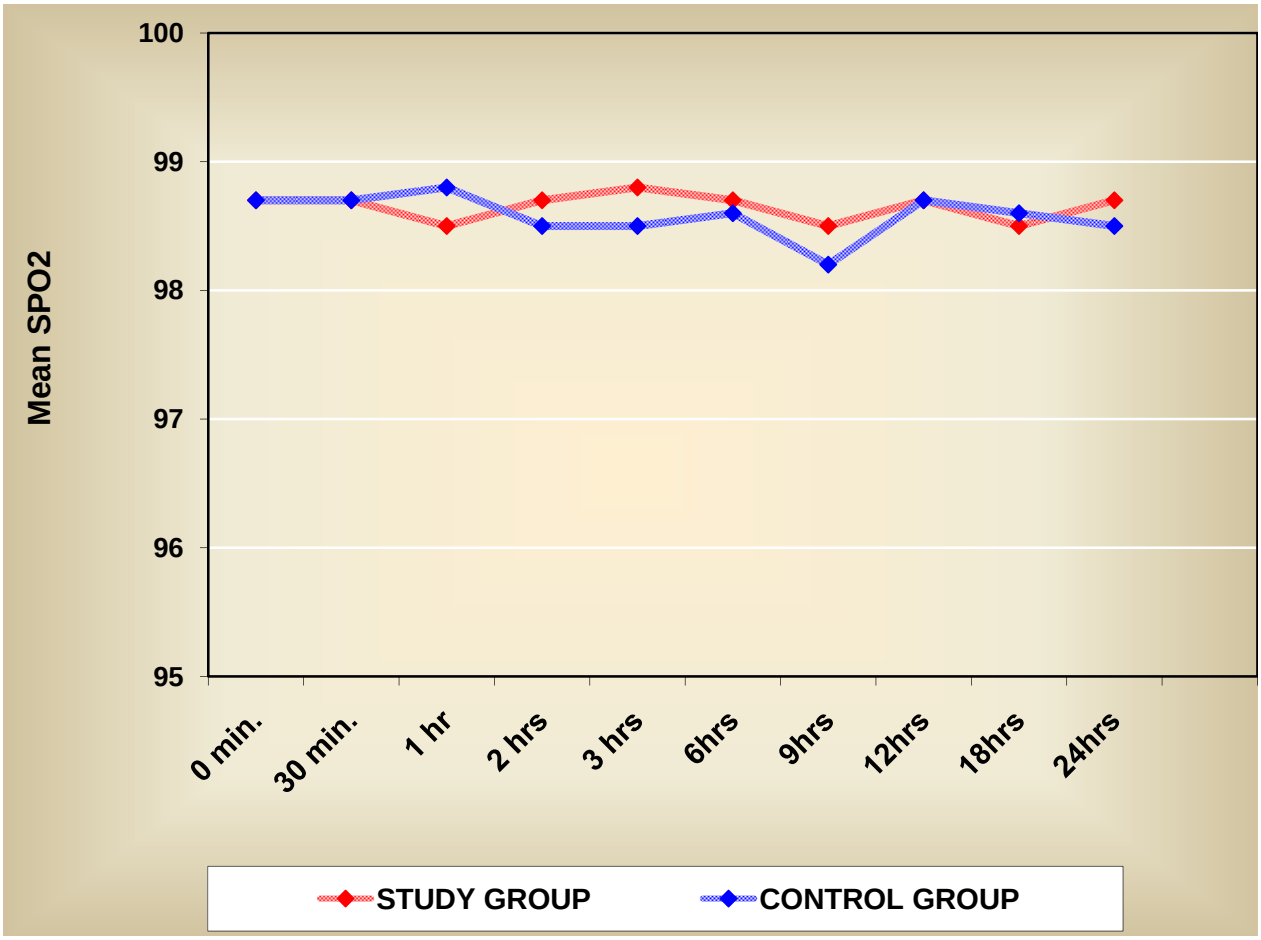


Table 19: Changes in SPO2

SPO2 at	SPO2(%) in				'p'	Significance
	Study Group		Control Group			
	Mean	SD	Mean	SD		
0 minute	98.7	0.7	98.7	0.7	0.674	**Not significant**
30 minutes	98.7	0.6	98.4	0.6	1.0	**Not significant**
1 hour	98.5	0.5	98.8	0.7	0.1353	**Not significant**
2 hours	98.7	0.6	98.5	0.6	0.1633	**Not significant**
3 hours	98.8	0.7	98.5	0.6	0.1848	**Not significant**
6 hours	98.7	0.6	98.6	0.6	0.3527	**Not significant**
9 hours	98.5	0.5	98.2	0.6	0.2435	**Not significant**
12 hours	98.7	0.6	98.7	0.5	0.1134	**Not significant**
18 hours	98.5	0.5	98.8	0.7	0.1353	**Not significant**
24 hours	98.7	0.6	98.5	0.6	0.1633	**Not significant**

There was no statistically significant difference in peripheral oxygen saturation changes between the two groups.

CHANGES IN SPO2



DISCUSSION

Pre emptive analgesia is a modality of analgesia that is provided before surgery. It results in interruption of transmission of pain signals arising from various noxious stimuli. This interruption of pain signals abolishes the sensitization of both central and peripheral pain pathways.

Recently regional anaesthetic techniques including peripheral nerve blocks are commonly used in the management of perioperative pain for due to their distinct advantages over general anaesthesia and central neuraxial anaesthesia.

Pain relief with peripheral nerve block is devoid of adverse effects like somnolence, hemodynamic instability, nausea, vomiting and voiding difficulties inherent to general anaesthesia and central neuraxial anaesthesia.

Other methods to reduce postoperative pain following thyroid surgeries include wound infiltration with local anaesthetics, cervical plexus block which includes both superficial and deep cervical plexus block.

Among this bilateral superficial cervical plexus block is commonly used due to its efficacy and simplicity in performing the technique and without much complications. Deep cervical plexus block is an alternative technique but associated with serious complications like phrenic nerve palsy.

Diedonne et al showed that pain following thyroid surgeries includes two components, superficial and deep. But superficial component is considered as the major source of post-operative pain. This study showed reduced postoperative pain intensity and opioid requirement thus proving large superficial component of post thyroidectomy pain.

Ashraf A Moussa et al found out that there was no difference between superficial cervical plexus blocks and combined superficial and deep cervical plexus block in analgesic requirements.

This technique of combining superficial and deep cervical plexus block was commonly employed for patients undergoing carotid endarterectomy in conditions where general anaesthesia is contraindicated.

Deep cervical plexus block has got its own disadvantage ranging from difficulty in performing the block to more serious complications like phrenic nerve palsy, most common one .Others include epidural or subarachnoid or vertebral artery injection.

In this study following parameters are observed and compared:

- Total dose of Intraoperative fentanyl requirement
- Total dose of Postoperative Morphine requirement

- Postoperative side effects
- Complications associated with the procedures

Intra operative and Post-operative Opioid consumption:

In this study intraoperative fentanyl requirement in study group was 79.7 ± 8.7µg and in control group was 132.5 ± 14.2µg which was (p value .0001)statistically significant.

There was statistically significant difference (p value .0001) between the two groups in morphine requirements in post anaesthetic care unit, surgical intensive care unit and also in 24hour dose requirements. Study group required less morphine than control group.

Study group had a morphine requirement of 0.83 ± 1.93 mg, 1.97 ± 2.37 mg and 2.8 ± 3.6 mg in post anaesthetic care unit, surgical intensive care unit and in the first 24 hour postoperative period respectively while control group had 6.13 ± 3.59 mg, 5.07 ± 1.74 mg

and 11.2 ± 4.1 mg in post anaesthetic care unit,surgical intensive care unit and in the first 24 hours postoperative period respectively.

Overall 93.3% patients required morphine at any time during the first 24 hours postoperatively in control group compared to 43.3% patients in study group.

70% patients in control group had VAS score of > 40mm in immediate post-operative period compared to 16.7% in study group.

Ashraf A Moussa et al (AJAIC 2006) their study showed the advantage of giving bilateral superficial cervical plexus blocks compared to General Anaesthesia alone without any block had opioid sparing effect both intraoperatively and postoperatively and also lower Visual Analogue Scale score both in surgical intensive care unit and first 24 hour postoperatively.

Significantly **lower intraoperative remifentanil** was required in blockgroups (39.97% and 41.67% respectively) when compared to control group. 50% of patients with superficial cervical plexus blocks did not require any analgesic in the post anaesthetic care unit, while 33.3% of the patients in both groups, did not require morphine during the 24 hrs after surgery. The morphine requirements in both active block groups was 50% less than the control group in the post anaesthetic care unit and around 60%, less in the ward, 24 hours after surgery. In this study, deep cervical plexus block did not have any extra opioid sparing benefits when compared to patients with bilateral superficial cervical plexus block.

Diedonne et al, showed performing cervical plexus block decreased the analgesic requirement in both immediate and late (first 24 hours) post-operative period. Only 55% of patients needed opioids in the immediate post-operative period and 65% in the first 24 hours post operatively.

Gozal et al conducted a study which showed that thirty percent patients only required opioids, when the wound was infiltrated with 10 ml of 0.5% bupivacaine.

Hannibal et al showed pre-operative wound infiltration by bupivacaine reduced early and late post-operative morphine requirement.

Andrieu et al showed that intraoperative sulfentanil requirements were reduced in superficial cervical plexus block groups. Post operatively, nefopam requirement was also reduced in cervical plexus block group .There were no complications related to superficial cervical plexus block.

Prasad, Shanmugam, Pandit et al described superficial cervical plexus block as cost effective, lower risk with fewer complications providing good analgesia , adequate patient satisfaction and shortened hospital stay.

Postoperative side effects:

Vomiting

Five patients had vomiting in study group compared to Eight patients in control group inthe post-operative period, even though control group had higher incidence it was not statistically significant (‘p’ value 0.5308).

Sonner et al, in their study reported high incidence of post-operative vomiting following thyroidectomy which was around 55%. Thyroid surgery has high risk of nausea and vomiting post operatively, whichis more common among women and with volatile anaesthetics.

Sedation

In study group maximum Ramsay sedation score was Two. Even though 13.3% subjects in control group had sedation score of Three, it was not statistically significant (‘p’ value 0.0562).

Complications:

None of the patients in both the groups had vascular puncture, local anaesthetic toxicity, phrenic nerve palsy, spinal or epidural blockade.

As such complications with superficial cervical plexus block are very rare and few but when combined with deep cervical plexus block complication rate increases and also of more serious nature like phrenic nerve palsy etc.

World Journal of Surgery 2010 ,in this article they have mentioned that one patient had phrenic nerve and brachial plexus blockade following superficial cervical plexus block with 0.5% Bupivacaine, 12ml on both sides, that resolved after 6 hours .Reason noted was the patient was thin and most probably injection was deeper .

There was no incidence of bradycardia, vascular puncture, hypotension, respiratory depression, and fall in oxygen saturation, phrenic nerve palsy, epidural or intrathecal injection or local anaesthetic toxicity in both the groups.

SUMMARY

The aim of the study was to prospectively evaluate the analgesic efficacy of preoperative bilateral superficial cervical plexus block in patients undergoing thyroidectomy under general anaesthesia. This study included 60 eligible patients who were divided into two groups, 30 in each. **Study Group** received bilateral superficial cervical plexus block with Bupivacaine 0.25% 10ml on each side ,**Control Group** received bilateral superficial cervical plexus block with normal saline 10 ml on each side. Block was performed 20 mins prior to induction using landmark technique. After waiting for onset time of around 10 – 15 minutes the blockade was assessed by pin prick by a separate assistant, General Anaesthesia was given to all patients. Anaesthesia was standardized for all patients.

Intraoperative monitoring was done using multipara monitor which includes pulse rate, saturation, bloodpressure, end tidal carbon dioxide and electrocardiography.If mean arterial pressure or heart rate rises by more than 20% above basal values addition fentanyl citrate dose of 0.5 µg /kg was given. At end of the surgery residual neuromuscular blockade was reversed and patients were extubated. After extubation, laryngoscopy was done to evaluate the vocal cord movements and then patient transferred to post anaesthetic care unit.

In post anaesthetic care unit, post-operative pain assessment was done by using visual analogue scale score (VAS score) when patient was able to communicate (H0),then after every 3 hours for the first 12 hrs (H3,H6,H9,H12) and every 6hrs until 24 hrs(H18,H24) .Patients stayed for 2 hours in PACU, then shifted to Surgical Intensive Care Unit (SICU).If VAS ≥ 40mm, Morphine 1 – 2 mg given IV, then patients were assessed every 10 minutes until VAS score becomes <40mm.

Observations:

Complications of the procedure like vascular puncture, hematomas etc. if occurred were noted down.Only successful blocks were considered for study group. Demographic details were comparable in both groups. Base line hemodynamic variables were also comparable in both groups. In the intraoperative period, the total dose of intraoperative opioid used was noted. In the postoperative period number of patients having VAS ≥ 40mm at H0, morphine requirement in PACU and patients requiring morphine in SICU and its dosage were recorded. Post operatively patients were monitored for any episodes of bradycardia, hypotension, nausea, vomiting, excessive sedation and respiratory depression - respiratory rate and oxygen saturation was monitored.

Of the two groups intraoperative fentanyl requirement in study group was 79.7 ± 8.7µg and in control group was 132.5 ± 14.2µg which was significant (p value = 0.0001). Study group had a morphine requirement of 0.83 ± 1.93 mg ,1.97 ± 2.37 mg and 2.8 ± 3.6 mg in post anaesthetic care unit , surgical intensive care unit and in the first 24hour postoperative period respectively while control group had 6.13 ± 3.59 mg, 5.07 ± 1.74 mg and 11.2 ± 4.1 mg in post anaesthetic care unit ,surgical intensive care unit and in the first 24 hour postoperative period respectively which was statistically significant (p value= 0.0001).

Overall 93.3% patients in the control group required morphineat any time during first 24 hours postoperatively compared 43.3% patients in study group which was statistically significant (p value 0.0001).

70% patients in control group had VAS score of > 40mm in immediate post-operative period (H0) compared to 16.7% in study group which was significant statistically (p value 0.0001).

Five patients in study group and Eight patients in control group had post-operative vomiting. Even though control group had higher incidence, it was not statistically significant (‘p’ value 0.5308).

In study group, maximum Ramsay sedation score was two. Even though 13.3% patients in control group had sedation score of three, it was not statistically significant (‘p’ value 0.0562).

There was no incidence of bradycardia, vascular puncture, hypotension, respiratory depression, and fall in oxygen saturation, phrenic nerve palsy, epidural or intrathecal injection or local anaesthetic toxicity in both the groups.

CONCLUSION

In conclusion, the data and the statistical analysis suggest that "**Bilateral superficial cervical plexus block**"is an effective and safe peripheral nerve blockade technique which reduces opioid requirements both intra operatively and post operatively and also reduces pain intensity score in post-operative period without any serious complications for patients undergoing thyroid surgeries under general anaesthesia.

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PROFORMA

EVALUATION OF ANALGESIC EFFICACY OF PREOPERATIVE BILATERAL SUPERFICIAL CERVICAL PLEXUS BLOCK IN PATIENTS UNDERGOING THYROIDECTOMY UNDER GENERAL ANAESTHESIA

Name of the patient: IPNo: Date:

Age / Sex: M / F Weight: kgs Diagnosis:

Surgery: ASA :I / II / III

Duration of surgery:- mins Duration of Anaesthesia:- mins

INVESTIGATIONS:

Blood:

Hb % Sugar: mg% Urea: mg% Creatinine: mg%

Serum: Sodium meq/L Potassium: meq/L

ECG:

ECHO:

TFT: T3: ng/dl T4: µg/dl TSH: µIU/ml

Preoperative Vitals:

Pulse rate: /min Blood pressure: / mmhg SPO2: %

Premedication:Inj. glycopyrolate 4 **µg** /kg, midazolam 0.05mg /kg

Group: Study:- BSCPB with bupivacaine 0.25%

Control:- BSCPB with normal saline

Performed bilaterally - 10ml on each side.

Block performed 20 mins prior to induction.

Anaesthesia standardized for all patients

Induction:- Inj.Propofol 2mg/kg, Inj .fentanyl 2 µg /kg, Inj.suxamethonium 1.5mg/kg

Maintenance:- N2O:O2::66:33% , Sevoflurane 2% ,Inj. Atracurium infusion 0.5mg/kg/hr

Reversal : Inj.glycopyrolate 10 µg /kg , Inj.neostigmine 40 µg /kg

Supplemental Fentanyl dose given (0.5 µg/kg) – when there is increase in mean arterial pressure(MAP) or heart rate(HR) of > 20 % from the base line values.

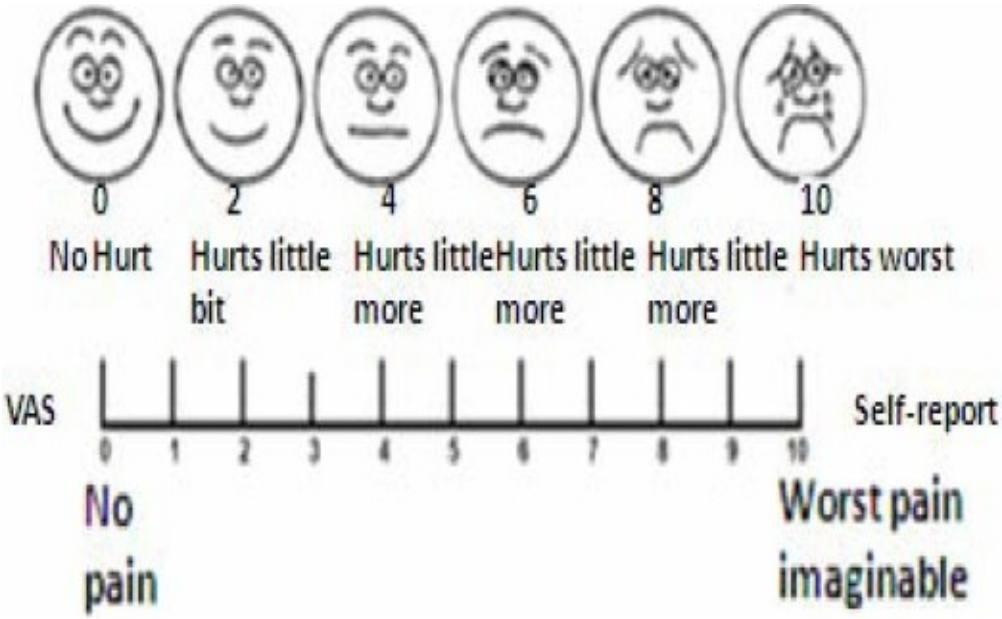
Intraoperative monitoring - done using multiparameter monitor which includes pulse rate ,saturation ,blood pressure including mean arterial pressure, end tidal carbon dioxide and electrocardiography.

After extubation:- Vocal cord movements –

Intraoperative fentanyl dose:

Postoperative monitoring:

Post-operative pain assessment using VAS: H0 in PACU when patient able to communicate, every 3hrs for the first 12 hrs & every 6hrs until 24 hrs.(H0, H3, H6,H9,H12,H18,H24)



If VAS ≥ 40mm inj Morphine 1- 2mg given, assessed every 10 mins until VAS <40mm

	H0	H3	H6	H9	H12	H18	H24
VAS							
Morphine requirement							

Total dose of morphine requirement:

PACU: mg SICU: mg

Total dose: mg

Side effects: Bradycardia/ Hypotension /Nausea / Vomiting/ Sedation/ Respiratory depression

Respiratory rate: /min

Oxygen saturation: %

Hypotension: fall of more than 30% from the baseline blood pressure or the systolic blood pressure less than 90mmHg, it was treated with fluids, vasopressors as necessary.

Bradycardia: Heart rate less than 50/min and was treated with atropine.

Sedation: Ramsay sedation score (1 -6):

Patient awake:

- Anxious and Agitated - 1
- Oriented and comfortable - 2
- Follows command only - 3

Patient sleeping:

- Response is brisk to glabellar tap/loud auditory stimuli - 4
- Response is sluggish - 5
- Response is absent– 6

Complications of Block- Hematoma / infection / any other adverse events were noted.

CONTROL GROUP - BSCPB WITH NORMAL SALINE

S.No	NAME	AGE (YRS)	SEX	WEIGHT (KGS)	IP NO	DIAGNOSIS	SURGERY	DOS (MINS)	DOA (MINS)	INTRAOP FENTANYL (mics)	VAS >40mm IN PACU (H0)	MORPHINE IN PACU (mg)	MORPHINE IN SICU (24HRS)	DOSE(mg)	TOTAL DOSE(mg)	PONV	SEDATION (RSS)
1	tamilarasi	30	F	45	650	MNG	NTT	120	140	110	**yes**	8	**yes**	6	14	**Y**	2
2	mahesmari	26	F	48	533	MNG	STT	95	120	125	no	0	**yes**	8	8	N	2
3	devaki	24	F	50	1278	MNG	STT	100	120	130	**yes**	7	**yes**	6	13	N	2
4	petchiammal	50	F	44	2253	Cathyr	TT	110	135	115	**yes**	6	**yes**	5	11	N	2
5	pandiyammal	60	F	48	2953	MNG	STT	85	110	130	no	0	no	0	0	N	2
6	ramzan	40	F	52	2494	MNG	STT	95	115	130	**yes**	9	**yes**	4	13	**Y**	2
7	jaya	36	F	56	2222	MNG	STT	95	110	140	**yes**	8	**yes**	6	14	**Y**	**3**
8	mookan	41	M	59	3813	MNG	STT	105	125	150	no	0	**yes**	6	6	N	2
9	saraswathy	55	F	54	6046	MNG	NTT	90	115	140	**yes**	6	**yes**	5	11	N	2
10	kavitha	30	F	48	6414	SNG	TT	95	120	110	**yes**	10	**yes**	4	14	**Y**	2
11	jyothi	29	F	48	6503	MNG	STT	90	110	120	no	0	**yes**	6	6	N	2
12	nirmala	30	F	44	5805	MNG	TT	95	120	110	**yes**	9	**yes**	7	16	**Y**	**3**
13	mariammal	37	F	48	9951	MNG	TT	100	125	120	no	0	**yes**	5	5	N	2
14	subashini	23	F	55	7511	MNG	STT	110	135	140	**yes**	8	**yes**	4	12	N	2
15	veeralakshmi	45	F	58	9497	MNG	STT	105	130	145	**yes**	9	**yes**	5	14	N	2
16	malliga	34	F	51	3858	MNG	STT	100	125	120	no	0	**yes**	7	7	N	2
17	selvi	33	F	50	9202	MNG	TT	95	120	130	**yes**	7	**yes**	6	13	N	2
18	kamatchi	32	F	48	11187	MNG	STT	100	115	130	**yes**	8	**yes**	5	13	N	2
19	amudha	36	F	47	5020	MNG	NTT	105	120	130	**yes**	6	**yes**	7	13	N	2
20	lakshmi	40	F	46	6433	MNG	NTT	110	130	130	**yes**	10	**yes**	4	14	**Y**	**3**
21	kaleeswari	20	F	54	14365	MNG(T)	STT	110	130	140	no	0	no	0	0	N	2
22	raja	46	M	64	12647	MNG	STT	105	130	160	**yes**	8	**yes**	4	12	N	2
23	muthamal	45	F	52	9961	MNG	TT	95	120	130	**yes**	9	**yes**	6	15	**Y**	**3**
24	devi	56	F	49	14354	MNG(T)	STT	100	125	125	**yes**	7	**yes**	6	13	**Y**	2
25	shanthi	46	F	54	18724	MNG	STT	105	130	140	no	9	**yes**	4	13	N	2
26	ramachandran	55	M	49	19382	MNG	STT	100	125	130	**yes**	8	**yes**	6	14	N	2
27	manimegalli	53	F	51	16152	MNG	STT	105	125	130	**yes**	8	**yes**	5	13	N	2
28	kavitha	36	F	54	22288	MNG	STT	110	130	145	**yes**	8	**yes**	5	13	N	2
29	vadivelu	20	M	56	22878	MNG	STT	105	130	150	**yes**	9	**yes**	4	13	N	2
30	ramesh	27	M	64	22955	MNG	STT	95	115	170	no	7	**yes**	6	13	N	2

STUDY GROUP - BSCPB WITH BUPIVACAINE

S.No	NAME	AGE (YRS)	SEX	WEIGHT (KGS)	IP NO	DIAGNOSIS	SURGERY	DOS (MINS)	DOA (MINS)	INTRAOP FENTANYL (mics)	VAS >40mm IN PACU	MORPHINE IN PACU (mg)	MORPHINE IN SICU (24HRS)	DOSE(mg)	TOTAL DOSE(mg)	PONV	SEDATION (RSS)
1	sundari	50	F	56	58733	MNG	TT	105	125	80	no	0	no	0	0	N	2
2	nagammal	54	F	48	60435	MNG	TT	100	120	70	no	0	no	0	0	N	2
3	chittammal	44	F	55	58801	MNG	STT	95	115	90	no	0	yes	5	5	N	2
4	sudha	24	F	53	62326	MNG	STT	100	120	90	no	0	no	0	0	N	2
5	alagi	50	F	48	53956	MNG(T)	NTT	105	125	80	no	0	no	0	0	N	2
6	seeramal	35	F	48	63584	MNG	STT	110	130	80	yes	6	yes	3	9	**Y**	2
7	selvi	50	F	44	57410	MNG(T)	NTT	100	115	70	no	0	no	0	0	N	2
8	vasantha	30	F	51	61552	MNG	STT	105	120	80	no	0	yes	6	6	N	2
9	jyothi	55	F	50	6257	MNG	STT	95	115	80	no	0	no	0	0	N	2
10	shanthi	40	F	47	57882	MNG	STT	100	120	80	no	0	yes	4	4	N	2
11	parameshwari	45	F	53	66619	MNG	STT	105	125	90	no	0	no	0	0	N	2
12	nagajyothi	40	F	52	60782	MNG(T)	NTT	100	125	100	no	0	yes	5	5	N	2
13	latha	39	F	44	68117	MNG	STT	105	130	70	no	0	no	0	0	N	2
14	palaniyammal	38	F	47	69142	MNG	STT	110	125	75	yes	6	yes	3	9	**Y**	2
15	thavamani	30	F	49	69710	MNG	NTT	105	130	70	no	0	no	0	0	N	2
16	balaganesh	40	M	60	70539	MNG	NTT	95	120	80	no	0	no	0	0	N	2
17	manjammal	42	F	56	71076	MNG	STT	90	115	75	no	0	yes	5	5	N	2
18	jemila	23	F	51	73439	MNG	STT	95	115	70	no	0	no	0	0	N	2
19	devi	31	F	46	69751	NG R(T	NTT	100	120	75	yes	4	yes	4	8	N	2
20	selvarani	35	F	45	62020	MNG	STT	110	130	70	no	0	no	0	0	N	2
21	lathalaxmi	32	F	50	63405	MNG(T)	NTT	85	110	80	no	0	yes	4	4	N	2
22	laxmi	40	F	51	53035	MNG	STT	95	115	70	no	0	no	0	0	N	2
23	seetha	53	F	50	64064	MNG	STT	95	120	70	yes	5	yes	5	10	**Y**	2
24	james	52	M	64	63375	MNG	NTT	105	125	100	yes	4	yes	6	10	N	2
25	vellathai	36	F	47	64046	MNG	NTT	90	110	80	no	0	no	0	0	N	2
26	prabha	36	F	54	62479	MNG	TT	95	120	90	no	0	yes	5	5	N	2
27	chittammal	37	F	52	68742	MNG(T)	TT	90	115	80	no	0	no	0	0	**Y**	2
28	chandrika	40	F	51	68756	MNG	NTT	95	120	80	no	0	**yes**	4	4	N	2
29	karuppaih	47	M	56	79818	THYRO	TT	120	140	75	no	0	no	0	0	**Y**	2
30	muthukumar	30	M	60	80640	MNG	STT	110	135	90	no	0	no	0	0	N	2

Ref. No. 5336 /E4/3/2012

Govt. Rajaji Hospital,
Madurai.20. Dated: .08.2012

Institutional Review Board / Independent Ethics Committee.
Dr. N. Mohan, M.S., F.I.C.S., F.A.I.S.,
Dean, Madurai Medical College & 2521021 (Secy)
Govt Rajaji Hospital, Madurai 625020.
Convenor
grhethicssecy @gmail.com.

Sub: Establishment-Govt. Rajaji Hospital, aMadurai-20-
Ethics committee-Meeting Agenda-communicated-regarding.

The Ethics Committee meeting of the Govt. Rajaji Hospital, Madurai was held at 11.00 Am to 1.00Pm on 28.06.2012 at the Dean Chamber, Govt. Rajaji Hospital, Madurai. The following members of the committee have been attended the meeting.

---

1. Dr.N.Vijayasankaran,M.ch(Uro.) 094-430-58793 0452-2584397	Sr.Consultant Urologist Madurai Kidney Centre, Sivagangai Road,Madurai	Chairman
2. Dr.P.K. Muthu Kumarasamy, M.D., 9843050911	Professor & H.O.D of Medical, Oncology(Retired)	Member Secretary
3. Dr.T.Meena,MD 094-437-74875	Professor of Physiology, Madurai Medical College	Member
4. Dr. S. Thamilarasi, M.D (Pharmacol)	Professor of pharmacology	
5.Dr.Moses K.Daniel MD(Gen.Medicine) 098-421-56066	Professor of Medicine Madurai Medical College	Member
6.Dr.M.Gobinath,MS(Gen.Surgery)	Professor of Surgery Madurai Medical College	Member
7.Dr.S. Dilshadh, MD(O&G) 9894053516	Professor of OP&Gyn Madurai Medical College	Member
8.Dr.S.Vadivel Murugan., M.D, 097-871-50040	Professor of Medicine Madurai Medical College	Member
9.Shri.M.Sridher,B.sc.B.L. 099-949-07400	Advocate, 2, Deputy collectors colony 4th street KK Nagar, Madurai-20.	Member
10.Shri.O.B.D.Bharat,B.sc., 094-437-14162	Businessman Plot No.588, K.K.Nagar,Madurai.20.	Member
11.Shri. S.sivakumar,M.A(Social) Mphil 093-444-84990	Sociologist, Plot No.51 F.F, K.K Nagar, Madurai.	Member

Following Projects were approved by the committee

Forwarded to
Dr. Harish Kumar
21/8/12

Sl. No	Name of P.G.	Course	Name of the Project	Remarks
1.	Dr. Hariskumar. M.P	M.D Anaesth	Superficial cervical block for improving post-op analgesia in throid surgeries done under general anesthesia.	Approved

Please note that the investigator should adhere the following: She/He should get a detailed informed consent from the patients/participants and maintain Confidentially.

1. She/He should carry out the work without detrimental to regular activities as well as without extra expenditure to the institution to Government.
2. She/He should inform the institution Ethical Committee in case of any change of study procedure site and investigation or guide.
3. She/He should not deviate for the area of the work for which applied for Ethical clearance.

She/He should inform the IEC immediately, in case of any adverse events pr Serious adverse reactions.

4. She/he should abide to the rules and regulations of the institution.
5. She/He should complete the work within the specific period and apply for if any Extension of time is required She should apply for permission again and do the work.
6. She/He should submit the summary of the work to the Ethical Committee on Completion of the work.
7. She/He should not claim any funds from the institution while doing the word or on completion.
8. She/He should understand that the members of IEC have the right to monitor the work with prior intimation.

DEAN 13.8.12
I/C

To
All the above members and Head of the Departments concerned.
All the Applicants.

21/12/12

DIRECTOR
INSTITUTE OF ANAESTHESIOLOGY
Madurai Medical College &
Govt. Raj ji Hospital,
MADURAI 625020.

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EVALUATION OF ANALGESIC EFFICACY OF PREOPERATIVE BILATERAL SUPERFICIAL CERVICAL PLEXUS BLOCK IN PATIENTS UNDERGOING THYROIDECTOMY UNDER GENERAL ANAESTHESIA A STUDY OF 60 CASES DISSERTATION SUBMITTED FOR THE DEGREE OF DOCTOR OF MEDICINE BRANCH – X (ANAESTHESIOLOGY) APRIL-2013 THE TAMILNADU DR. M.G.R. MEDICAL UNIVERSITY CHENNAI, TAMILNADU BONAFIDE CERTIFICATE This is to certify that this dissertation entitled “EVALUATION OF ANALGESIC EFFICACY OF PREOPERATIVE BILATERAL SUPERFICIAL CERVICAL PLEXUS BLOCK IN PATIENTS UNDERGOING THYROIDECTOMY UNDER GENERAL ANAESTHESIA” is a bonafide record work done by Dr.HARISH KUMAR M.P. under my direct supervision and guidance, submitted to the Tamil Nadu Dr....

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A STUDY OF 60 CASES

DISSERTATION SUBMITTED FOR THE DEGREE OF

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